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BY A RAMBLER IN THE MOUNTAINS OF VIRGINIA,

With Notes by the Editor of The Farmers' Library, to whom they were addressed.

WARM SPRINGS, Va., July 12, 1847.

DESCRIPTION OF MONTPELIER.

YOUR readers were conducted in my last, if they had the patience to follow me, to *Montpelier*, the residence of Doctor P. Thornton, in Rappahannock County, Virginia; and there might any valetudinarian—or well man either—be well content to dwell, if in pursuit only of a climate as salubrious as the far-famed Montpellier in France—without having any occasion or desire for the drugs, verdigris, perfumed waters and apothecaries for which the latter is distinguished as well as for its healthy air. During three weeks of delightful sojourn—realizing all that tradition tells us of the generous hospitality and good living of old Virginia in her greatest prosperity—while you were being fried, roasted and stewed, with the mercury rising well up toward 100, it rarely got up to 80 at Montpelier—falling always at night below the mark that inclines you to pull up at least one blanket before daylight.

As to the Establishment "*per se*," and in connection with the estate of 1,000 acres attached to it, all under view; and the surrounding scenery, bounded on all sides, within a few miles, by an irregular, undulating mountain outline, it is but a just tribute to the taste that selected and improved it as a place of residence, to say that in my recent rambles from the Crescent City on the Mississippi to the "Hights of Abraham," on the St. Lawrence, I have seen no establishment that combined so much pleasantness and natural beauty of climate and scenery.

A better idea may be had of the site itself by supposing a natural mound of about two acres on its summit, sloping away on all sides to ten or twelve at its base, situate in the center of a lake of oblong figure—covering altogether an interval of about two thousand acres of flat land. As the water forced its way and escaped through a fissure in the mountains, this mound doubtless showed itself, at first a small island in its midst—and finally, when the water had subsided, leaving a bold stream only to traverse the Valley on its way to the Rappahannock, there stood this beautiful mound, fitted by Nature for the residence of the proprietor of the whole interval. That proprietor was the father of the present owner, and of a numerous family—his possessions here embraced ten thousand acres in a body, whereof this estate is all that remains in their hands; sharing in this respect the common fate of the large domains of the old wealthy and high-bred families of Virginia, at the close of the Revolution. The mountain sides in view of Montpelier are covered with trees of almost all the kinds that lend to our au-

tumna forests the charms of all colors interspersed.* Even now may be distinguished the deep, dark green of the Chestnut-Oak and Hickory, from the paler shades of the Dogwood and Locust; while here and there these mountain slopes are dotted to their very summits with small cultivated farms, as if at once to enliven the prospect and to show that Nature has here thrown up no high inaccessible to the spirit of human industry.

In thus casting behind a "long, lingering look" on the beauties of a private establishment, there has been, it may be confessed, something of an inward purpose to reproach, impliedly, that all-engrossing spirit of accumulation which leads our countrymen, characteristically, as it has been alleged, to regard nothing but the "almighty dollar" as worthy of any concern. Hence it is that we see, all along our public roads, so many dwellings exposed to the unmitigated heat of the sun, with scarcely a tree or shrub for shade or ornament; while most of the few attempts that are made at embellishment violate at once every principle of Art and all the rules of Nature. Savages may have their strong local attachments to their native forests and hunting-grounds; but these are founded in sensual associations, for in these have they found the means of appeasing their animal appetites. Here have been the theatres on which have been indulged the kindred passions for the chase and for war; but when was Indian or African ever known to take any pleasure in the mere quiet beauties of Nature as they commend themselves to imaginations refined by moral culture? When were they ever seen to evince any pleasurable emotion at the sight of the most extended prospect of mountain and valley—or to lift up their hands with rapture at the limitless expanse of the Ocean itself! No, Sir, the perception of the picturesque and the sublime is the fine fruit of intellectual cultivation—and he whose soul is insensible to the beauties and the grandeur of Nature may well be suspected of a like insensibility to the finer feelings and duties of social and domestic life. On the other hand, a taste for rural ornament may serve to assuage the cares of adversity, and has even been thrown in, with a judgment true to nature, as a relieving virtue to save the worst of outlaws from unmitigated abhorrence. Thus with the Pirate Lambro, there was

"A taste seen in the choice of his abode,
A love of music, and of scenes sublime;
A pleasure in the gentle stream that flowed
Past him in crystal; and a joy in flowers,
Bedewed his spirit in his calmer hours."

Is it not, then, Mr. Editor, time for the community to cultivate among our young people, more generally and systematically, as you have strongly urged, a taste for, and knowledge of the principles of Rural Architecture and embellishment of their homesteads, if we would aspire, as a nation, to any of the graces of Civilization and the softer amenities that should characterize a refined and polished people? Alas! that in this age of Christianity and of boasted Progress, in this our republican country, the Government should be deemed incompetent to give or provide for instruction of the rising generation in anything but the—art of destruction of their fellow-men! And shame to say! the landholders of the United States—the single class whose labor produces more of the national wealth than all others united—seem either content to have it so, or have not the spirit or understanding to redress themselves; nor will they have until they have the discernment and independence to be represented, in much greater proportion, by cultivated men of their own class animated by that perfect sympathy which is only the fruit of perfect identity of condition and pursuit.

Were I to suggest any addition to an Arboretum so handsome and well arranged as that at Montpelier—where *ars colare artem* seems to have been the

* Our correspondent adverts here to a remarkable feature in the character of these mountains. Their tops are covered with a stunted and not very various growth, while the Valley immediately beneath throws up timber fitted for any purpose. We gathered, some days since, on one of the spurs near the foot of the Warm-Springs mountain, within a very small space, branches of more than twenty trees, viz: the Chestnut, Chestnut Oak, White-Oak, Red-Oak, Black-Oak, Hickory, Linn, Gum, Elm, Cucumber-tree, Sassafras, Iron-wood, Wild Cherry, Locust, Sugar-Maple, Walnut, Wild Plum, Dogwood, and two kinds of Pine.

Ed. Farm. Lib.]

guiding motto—it would be to add the Sugar-Maple ; our native broad-leaved Elm, with its long and graceful branches ; and the Hæmatac, or Tamarac, the most beautiful of the Pine family, to which it belongs. These, intermingled with the native Oak, the Spruce and Pine, the Cedar and other pines and evergreens, the Poplar, Locust, Mulberry, Hickory and Walnut already there, in all their majesty and beauty, would be sufficient both for shade and variety.

Leaving Montpelier, the road to the Valley of Shenandoah leads through “Thornton’s Gap” in the Blue Ridge, to Luray, the Capital of Page County, (formed out of parts of Rockingham and Shenandoah, in 1801,) intersecting the Macadamized turnpikes leading from Winchester to Staunton at Newmarket in Shenandoah.

HUSBANDRY SUITED TO THE COUNTRY THROUGH WHICH WE HAVE PASSED.

Looking back now to the *Agriculture* of the counties east of the Blue Ridge, it appears to me that as far as the inhabitants of the region from Fredericksburg to Thornton’s Gap depend upon the cultivation of *grain* with *slave labor*—or with any labor—as a reliable source of income, and with any expectation of even checking their lands in the progress of exhaustion, they are too surely doomed to disappointment, if not to ruin, with which, alas ! in this, more than in any other pursuit, men are apt to be overtaken without suspecting its approach or knowing precisely whence it comes. How should they know who enter into no calculations, and keep no accounts ?—as though “where ignorance is bliss ’twere folly to be wise.” And so it would be if—the bliss would only continue ! My impression, from personal observation and the best information I could get, (and making the proper allowance for the overestimates generally made by the most candid farmers as to their own settlements,) is that the average produce in Wheat does not come up to *seven bushels to the acre*, and 15 or 20 of Corn, through the whole region here referred to—between Fredericksburg and Thornton’s Gap, and until you get into Page County on the Shenandoah. The corn is probably nearly all consumed in these counties for the subsistence of the inhabitants and domestic animals—most of it by that most expensive of all machines, the *horse*, which here is used exclusively for farming purposes, against the plainest rules of economy that would suggest, to a much greater extent, at least, the use of the longer-lived and less delicate mule, and the coarser-feeding, patient, and at last *edible* ox. This system leaves for an exclusively grain farm very little except the *wheat*. Deducting from that what must be reserved for seed, and making a fair charge for expense of cultivation, harvesting, threshing and transportation to Fredericksburg—and there will remain, at the utmost, not more than three bushels clear per acre, or, say, \$300 for the produce of 100 acres. Thus, to my eye, the want of adequate physical force for thorough tillage, and for making at home and applying the manures so necessary, after all, for carrying land up to and maintaining it in any thing like its full capacity—the absence and dearness of lime—the face of the country—the great expense of transporting gypsum from tide-water and of sending the grain crops to market—the badness of the roads at the season of comparative leisure—and above all the evident natural congeniality of the soil to the growth of the various grasses, far beyond what would be yielded of them by lands of the same low capacity for producing grain on the tide-water : all and every consideration seem to suggest that the *rearing of stock*—horses, and more especially mules, cattle and sheep—is the true policy and business pointed out by Nature, and the change in its circumstances wrought by steam-power for the landholders generally in the region here designated. The clover—especially white clover—orchard-grass, timothy and red-top flourish almost everywhere, even over all the hills, and to all appearance naturally. Even the steep mountain-sides, when cleared and the brush burned, throw up excellent pasturage for sheep. It is, in fact, Sir, impossible to look at this fine, healthy, undulating country—with its numberless and never-failing springs of the purest water, capable of being so conducted as to convert so many hill-sides into water-meadows, and yet where not a drop of stagnant water offends any sense—thus to see fields that, by all comparison with lands of similar appearance elsewhere, would bring nothing but poverty grass, yet here covered with white clover and other good herbage : it is, I say, impossible to look—however transiently—at such a district, and to note its water-power so dispersed and abundant for driving all sorts of

machinery, without feeling it was designed by the God of Nature to become, in process of time—the fullness of which is now—a wool-growing and wool-manufacturing country. Its numerous cascades seem audibly to invoke the genius and enterprise of such men as Ellicott and Lawrence and Pratt to turn them to useful account; but here have they gone for ages as still they go—leaping from rock to rock, descending mile after mile, as much unheeded by man as by the deer that roams or the wolf that prowls in the neighboring mountains.

“The Southerner,” at Richmond, a vigorous and indomitable advocate of a self-sustaining policy for the State—urging the development and use of her own rich resources for her own benefit—computes the cost of the imported articles from the North annually for each county in the Southern States at \$80,000. That would make for Northern manufactures, for Fauquier, Culpeper and Rappahannock \$240,000 a year, or more than \$6 a head for every man, woman, and child—black and white. But I need not dwell on the adaptation of this reason to Sheep Husbandry, and especially to its fitness for raising the *finest* Wool, for which I see fifty cents have been lately offered and refused at Rochester, New-York. I would not dare attempt to poach on *this* manor of your very able and accomplished correspondent, Mr. Randall of that State, to whom the most intelligent southern cultivators I have met with acknowledge themselves to be greatly indebted for his comprehensive and skillful illustrations of that subject.

There are no two companions more congenial—none that lounge through the world together in greater harmony, than Ignorance and Indolence. What the one says, the other will swear to, and they have united in the dogma that this climate is unsuited to the growth of fine Wool—and that as for Manufactories, they must ever be excluded for want of capital and suitable operatives. I will not stop here to discuss either of these convenient excuses, my purpose being merely to give a sort of running, bird’s-eye view of the agricultural economy and resources as I go along; but from this purpose permit me so far to depart as to make, in reference to the appropriateness of this high and dry climate for growing the finest Wool, a single quotation from an elaborate examination into the industrial resources of England, the greatest wool manufacturing power in the world—particularly as to her capability to grow fine Wool. It will be seen how, nevertheless, her climate—almost the opposite to that of Virginia—cuts her off from self-supply. The reader will not fail to note how remarkable is the absence in Western Virginia of the very impediments that preclude the growth of this great staple of British Industry:

“There are two kinds of woollen goods which are formed by different modes of manufacture; and these, again, are founded on essential differences in the structure of wool. *Worsted* goods are formed of wool, the fibres of which are long, and have little twist. In such goods the web is formed only as the web of cotton or linen goods, by the opposition of the fibres or threads alternately crossing and parallel. But in what are properly woollen goods, as in broadcloths, after the web has been so formed, it is subjected to a violent beating in the tucking or fulling mill, during which the cloth shrinks very much in length and breadth, but thickens, and the individual threads of the web so mix with each other that they cannot be distinguished until it is much worn and becomes threadbare. Now for such goods a different kind of wool must be taken than for *worsted* goods. The fabric must be short and more twisted. These varieties of wool are known as short and long stapled. The cause of this difference is that each fibre of wool consists of a series of joints, and at each joint there are a set of projections, like the barb of a fish-hook. In long-stapled wool these joints are few and very weak—in short-stapled wool they are numerous and strong. If a handful of the latter be worked in the hands, the fibres will gradually interlace, and by these barbs catching into each other will lock into a kind of web, quite independent of spinning and weaving; they will form felt. It is in this way that the bodies of hats are made, as all furs possess the same property. Hence the making of cloth requires the spinning and weaving of the web in the first instance, and the subsequent partial felting of the fibres in the tucking or fulling mill.

“I notice these particulars, as the climate and vegetation of a country exercise remarkable influence on the staple and structure of the wool which the sheep produce, and thus, finally, on the description of manufactured goods. In *moist*, cold climates—such as that of the British Islands—the natural wool of the adult sheep is universally long-stapled and unfit for felting, while in dry climates with hot summers the wool is short-stapled and felts strongly. The wool produced not merely in Ireland, but in England also, is thus exclusively adapted for the *worsted* trade; and that of Ireland being of an excellent quality of fibre, is much sought after for the finer kinds of *worsted*. For woollen cloths and similar

goods the wool is imported from the Continent. The great plains of the East of Europe support vast flocks of sheep, whence we derive our Silesian and Saxon wool. The dry plains of South Australia are also favorable to the growth of fibre—and hence has been created, within a few years, a branch of trade most important to that Colony. It has been an object with English wool-growers and landed proprietors to produce this felting-wool in England, and thus get rid of the necessity of purchasing abroad; but it has been found impossible, after the most expensive experiments in importing sheep of particular flocks. It has been found that in two or three generations, even of the pure breed, the influence of the climate and food totally changed the character of the wool, and brought it to the *same quality as that of the native animals*. With regard to woolens, this country [Ireland], like England, must import wool, and hence will be under the same conditions of access to raw materials as the sister kingdom."

In these statements of Doctor Kane we have the utmost confidence. They are derived, doubtless, from the best sources, and put forth with that care and discrimination which characterize him as one of the ablest writers on National Industry that has appeared in any age or country. It will be recollected by your readers that Von Thaër—in my judgment the most philosophical, profound and comprehensive of all writers on Agriculture—speaks of the adaptation of high, dry pastures for sheep, and estimates the expense of pasturage and keep of sheep as compared with cows as ten to one.

In mechanical industry, the cost of the motive-power of machinery bears but a small proportion to the other elements of cost of the manufactured article, but that of water-power is not put down at more than one-tenth that of steam. "An eminent manufacturer in Leeds," says Doctor Kane, "said to me that water-power is cheaper than steam at the mouth of the coal-pit"—and hence, wherever water-power is to be had, it is used in preference to steam; and it is alleged, moreover, that cotton spun by water-power bears and always has borne a higher price than cotton spun by steam-power.

After all, suppose the legislator for Virginia to desire to know the extent of the water-power of the State as connected with questions of Industry, and where would he get the information? But raise a question of one-tenth as much importance in any way connected with War, and Congress would appropriate hundreds of thousands for the survey. It would be quite easy to get a survey and map of any wild Indian or Mexican country, but quite impossible to get one dollar for laying down the mountains and water courses and power within the bosom of the old States.

Why, at all events, should not this noble old State, instead of persisting forever in the application of her slave labor (the best of which is culled and sent away) to objects for which neither that species of labor nor their climate nor locality are adapted—why should she not appropriate for the increase of her own resources her own peculiar advantages, even to the perfect manufacture of the wool, as Georgia is beginning to avail herself of the possession, in like manner, on the spot, of the great staple of another manufacture. Slaves must all—big and little, young and old—be maintained throughout the year, while the chief staple in these counties—wheat—demands their labor not more than one aggregate month in the year. Let them, then, betake themselves to cheese-making and to rearing stock and fattening it for market, where that can be done profitably. These pursuits call comparatively for little labor—and with wool-growing as an incident of this system they should combine the woolen manufacture, which offers employment for operatives of all ages and sizes, day in and day out, throughout the year, so that every consumer may be also, to some extent, a producer. As to the spirit that is beginning to animate even her more southern neighbors, let her sons read the following from the *Charleston Mercury*:

"We have been informed that a Cotton Manufactory at Columbus, Ga., has within the last three years cleared one hundred and fifty per cent. upon its capital, and that its net profits during the last twelve months amounted to 65 per cent.; and other factories have been doing a very successful business. We trust the day is rapidly approaching when a large proportion of the cotton crop of the South will be exported in the shape of cotton cloth."

With similar signs of enterprise and improvements on every side—on the East and the West, the North and the South—will this old "Mother of States" never wake up to avail herself of the bounteous offerings of Nature for her own support and aggrandizement?

HOW FAR SHOULD WE GO IN ENCOURAGEMENT OF DOMESTIC MANUFACTURES?

Do not, Sir, understand me as being willing to carry the practice of self-supply to the anti-social extreme that would shut up every man in his own shell, and lead to a state of barbarism by placing every individual in a state of isolation. Independence is a great blessing—but the greatest may be too dearly bought. I would not have every farmer construct a vat to tan his own leather, because it would cost more than it would come to; but I would have him send his hides to be tanned, in preference, by the tanner nearest home, who would be most apt to take his meat or his butter in part payment, provided he would supply his leather at a fair price. Our country—nay, this State—is a world in itself in extent and in capacity for producing all the necessities and most of the luxuries of life. With her capacity to produce provisions of all sorts—with her deposits of iron, of lead, of coal, of salt—her supplies of timber and of water-power—for how little need she go out of the State, and is it not self-evident that the more there are at other employments within her borders, the better and the more convenient is the market for the products of the agriculturist? The great obstacle, after all, is not so much in want of capital—not so much in any peculiar cast or prejudice of politics—but for the want of early, and proper, and suitable instruction of her young men in branches of knowledge which are indispensable to the perception and bringing into activity of great industrial resources. If she had possessed her schools of Art and Industry—such as they have in France—would she not have been ashamed to send copper ore, as I see she did some weeks since, from Prince William County all the way to Massachusetts, to have it smelted and valued?

RESOURCES OF PAGE COUNTY.

But to proceed on our journey. On reaching Luray, the county town of Page, we came—as they say in the East—to “quite another guess sort of country.” The valley which forms this county is traversed through its whole extent by the waters of the Shenandoah, and is justly considered as one of the most fertile in that celebrated Valley—still retaining the reputation in that respect, which it justly acquired in its early settlement, by comparison with older sections—a reputation which will not now stand the test, in comparison with newer settlements in more western States, or even with the Valley of the Kanawha, in this. In Page County some gentlemen of undoubted intelligence and candor gave me the average product at 15 bushels of Wheat—and Corn in proportion; but 12 would probably be nearer the mark, though in this County the proportion of absolutely poor land is very small. Its husbandry is mixed, between grazing and grain; and altogether it is one of the most fertile and independent counties in the States. It contains 374 square miles, or 243,100 acres—and if you will afford me the room, it would be no more than fair to quote in its favor the statement of Martin, that the land in this County “is generally of the very best quality of limestone valley land;—considered in relation to its agricultural advantages it is, with the exception of Jefferson, the richest County of its size in the State.” You may judge of its water-power from the fact that there are, or were in it in 1835, more than 100 mills, saw, merchant, and grist: besides six carding machines; three oil-mills; six hemp-mills; ten tan-yards; one blast-furnace for smelting and two forges for making bar-iron. “Vast quantities of iron ore are found in every part of the County; copper, lead and magnesia are also found in considerable quantities.”—With all these advantages it is difficult to account for the apparent decrease of population since 1830, except on the ground of some great oversight or mistake. Martin states it at 8,327 in 1830, and Darby gives it a population of only 6,194 in 1840—of which 216 were Free Colored, and 781 Slaves. Its access to market is by wagons to Winchester and across the Blue Ridge through Thornton’s Gap to Fredericksburg—except when the Shenandoah is in boatable condition in early spring. The hire for negroes is, for men, from \$50 to \$75 a year, and women \$30—and for white laborers \$7 to \$10 a month; and the price of land from \$30 to \$50, and even \$60, when well improved. The nature of the soil is much the same in this as in other parts of the Shenandoah Valley; its less undulating surface, and the higher price of land, seem to have given it the direction it has taken—more to grain-growing and to fattening cattle brought down from the western mountains—and invite less to Sheep Husbandry.

RUFFNER'S CAVE, IN PAGE COUNTY.

Martin, in his account of Western Virginia, has given a very interesting description of "the wonders of Cave-Hill," among other "curiosities"—closing with a romantic one of the interior apartments of *Ruffner's Cave*—situate about a mile from the road leading from Thornton's Gap to Newmarket, and said to be little inferior in extent and beauty to the celebrated "Weir's Cave," of which you gave, if I mistake not, a diagram and description, in your old American Farmer, some 28 years since. As you would not like to yield room for the glowing description given by one of the party of original explorers of this remarkable cavern, I will only trouble your readers with the following account of its first discovery:

"A Mr. Ruffner, who was nearly as much celebrated for deeds of sylvan prowess as the renowned Putnam, in passing this Cave, some thirty years ago, conceived the bold and hazardous design of entering it alone. He accordingly prepared himself a flambeau of pine, and placed his rifle across the mouth, to indicate, in case of accident, to his friends, if they should happen to see it, that he was in the Cave. He descended, but soon fell and put out his light—and, as might have been expected, was soon bewildered and lost in its labyrinth of passages. It happened that some of his friends in passing the Cave discovered his gun, and rightly concluding that he had gone into it, they procured lights, entered in search of him, found and brought him out, after his having been there forty-eight hours. This brave fellow was among the pioneers who were foremost in exploring and settling our western frontier; and was at last killed by the Indians, after having performed deeds of valor and daring prowess which would have done honor to the character of a hero."

DESCRIPTION OF NEWMARKET—ITS ANTI-SHADE TREES LAW.

Leaving Luray after breakfast, some 14 miles bring you to Newmarket; and as it has been set down in the common parlance of Gazetteers as "beautifully situated," and as, furthermore, its resources and destiny are committed to the corporate management of the Fathers of the City, I must describe it as I found it, if only to record one thing in their municipal polity which, with your love of trees, you will agree almost deserves corporeal punishment. Know, then, that Newmarket stands in the center of a valley where the rays of the sun concentrate between the mountains. The whole town consists of two parallel rows of wooden houses, with few exceptions two stories high—extending for a quarter of a mile on each side of a dusty turnpike. Well! the first impulse on being set down at the City Tavern in the noontide sun in dog-days is to inquire, Where in the name of comfort are your shade-trees? for not one is to be seen to relieve the glare of the sun's reflection from the houses and the broad Macadamized road—whereupon the plea of justification put in is that the wise Aldermen have strictly forbidden, in Newmarket, any man's performance of one of the three duties which it is appointed unto every man, as it is said, to perform in his lifetime—for here the *planting of trees is interdicted by law*—and for fear of what, does the reader suppose? Why for fear, in case of fire, that the trees might catch and spread the flame!

It were almost a pity but the wise framers of this prohibitory statute against trees could be prohibited themselves from all attempts to perform one of the other three cardinal duties of man, until this barbarous law should be repealed.—But to

THE AGRICULTURE OF THE VALLEY OF THE SHENANDOAH—ESPECIALLY THE LIMESTONE PORTION OF IT.

You may get a general idea of the scope of my inquiries into the agricultural resources, habits and productiveness of this famous Valley of the Shenandoah by the following Answers, with which I was promptly favored by one of its most distinguished citizens. The answers are made, as he informs me, by a scientific and practical farmer, who would be admitted as high and competent authority could I feel at liberty to give his name:—other among the most intelligent citizens in Winchester and the vicinity authorize a general approval of the statement:

1st. "At what price, generally, could the farmer of your County burn or purchase Lime—I mean the unslaked, one of which makes two slaked?"

Answer. About 12½ cents per bushel.

2d. "Is it much used as a fertilizer, on lime or free stone land, and with what effect?"

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Answer. Lime is but little used on limestone land, and where used, the effect has not been very decided, probably from its imperfect application—to a very small extent. On free stone and slate lands it is used with more marked benefit.

3d. "Is gypsum or plaster much used—in what way applied, and in what quantity—and with what effect, in public opinion, in its action on the crop or the land?"

Answer. It is extensively used, generally by itself, and at the rate of a bushel to the acre—sometimes in combination with leached ashes in the proportion of 1 to 2. It is applied, most commonly, to clover; sometimes to corn in the hill—generally at planting; some farmers harrow it in with wheat with good effect: its benefit is most decidedly perceived on clover—the great restorer and fertilizer of our lands. Some farmers have supposed that after a period of use it fails to produce its general effect; others seem to think that—from its stimulating property or other cause—it, in many cases, leaves the soil either exhausted, or less adapted to successful cropping of wheat. This opinion, however, is but limited; for plaster and clover are the main substitutes, in the County, for direct manure in maintaining the fertility of our lands. Gypsum is now abundant and cheap—costing at the Railroad dépôt from four to five dollars per ton.

4th. "Have your lands generally increased or diminished, within the last twenty or thirty years, in the average produce of wheat and corn—and what is the average through the County?"

Answer. It would be safe to say they had generally increased; the portions, however, of the County then in fresher cultivation have doubtless diminished in many cases in their products. There is a perceptible improvement in farming of late years. The limestone portion of Frederick County embraces from 60,000 to 65,000 acres; its average of wheat may be set down at ten bushels, and of corn about five barrels to the acre.

5th. "What is the price of your best lands—middling-sized and large farms?"

Answer. A farm of 250 to 300 acres of good limestone land, reasonably improved and convenient to market, will command from \$35 to \$50 per acre. Larger farms are at a rate from 15 to 20 per cent. less.

6th. "Does or does not the Valley suffer more than formerly with drouth—and is there not a general falling-off in the volume and constancy of your springs and spring branches?"

Answer. From the clearing of woodland, and the more general tillage of the County, it is reasonable to suppose that the water coming from the clouds is more rapidly carried off to the large streams: and it may be that some of the smaller springs may have disappeared, and, to a small extent, the spring branches may have consequently diminished—but there is scarcely any farm called a "dry farm" now that was not in the same condition thirty years ago; and our springs, almost without exception, still retain their constancy and remarkable copiousness.

7th. "Are oxen used to any considerable extent in the plow, and might they not be more generally substituted for horses in that sort of farm labor?"

Answer. Oxen are not used at all for plowing—they are considered too slow and not adapted to the broken character of our soil in many places, nor to the kind of hands they would generally have to be managed by. They are used for drudge work on a great many farms. In general farm-work the mule is somewhat used in addition to the horse—the main reliance of our farmer as the beast of labor.

8th. "Is the horse-rake in general use?"

Answer. It is, in making hay, and frequently with great benefit in the harvest field—immediately following the hands, in many cases.

9th. "What wheat-thresher is most used and approved?"

Answer. The six-horse spike-machine of various forms and constructions—recently a threshing and cleaning machine (combined) seems to attract much attention and is getting into use.

10th. "Are your farmers getting in the way of cutting their wheat by machinery—and if not, why have machines been used and found wanting—and in what?"

Answer. Our farmers use reaping-machines to a very limited extent—nor are they likely to employ them much. The not unfrequent limestone ledges and other inequalities of our lands seem to forbid the complete benefit of the reaping-machine, unless accompanied in places with the cradle. The defect in those introduced is mainly found in their not completely cutting the grain unless standing very favorably—but especially in not forming the sheaf regularly and in fair arrangement.

11th. "What are the usual wages given for white farm hands—what is the average allowance in provisions, especially meat to working negro hands, day by day, through the year?"

Answer. White hands are not to be obtained with readiness—their wages are from \$7 to \$10 per month, with board. The wages of negro men by the year are from \$50 to \$75—the allowance in meat, when particularly distributed, which is rare, may be from one-half to one pound—but with an abundance of vegetables the experience of one of our farmers has found the first quantity to be sufficient.

Thus have we the opinion of one of the most judicious farmers resident within

the famous limestone region of Virginia, that one of the most fertile Counties of the State does not average more than ten bushels of wheat to the acre. How strongly am I thus warranted in claiming for the whole Valley not more than twelve—might I not have named ten, and not exceeding seven for the counties eastward, between the Blue Ridge and Fredericksburg? Yet farther to show that I have probably over rather than under rated either of these portions of the State, it may be mentioned, as to another popular district, of more than a hundred miles in length between Lynchburg and Richmond on the line of the James River Canal, a valley of very unequal width, that a gentleman of much more than ordinary intelligence, Mr. B., resident there, rates the average produce of wheat at *not exceeding six bushels to the acre*. In England the estimate is that the average of the whole kingdom has been brought from 17 bushels, in 1821, to 26 bushels, in 1846, and this is ascribed chiefly to a better knowledge of the *principles of Agriculture*!—yet how few there are in the whole State of Virginia who read your FARMERS' LIBRARY—in the comprehensive scope of which are embraced all the discoveries and improvements in Agriculture that take place not only in England but in all countries? How can men learn without *thinking*? without *inquiry*?

GRAZING CATTLE

Is pursued as a business much more extensively in the Valley than in the Counties lying east of the Blue Ridge; many farmers fatten there for market from 50 to 100 head. The system is to buy stock-cattle, the rearing of which, in the more western counties, forms a separate department of that great branch of industry, and the impression with old farmers is that the quality of stock-cattle has deteriorated of late years; 25 or 30 years ago they still showed the fine effect of a cross from a stock called Miller's breed, which had been as many years before imported and probably were of the best Short-Horns. That blood has been frittered away until it has run out, and the breeders of stock-cattle seem not to have the sagacity and energy (without which men should not expect to thrive in any business) to purchase Short-Horn bulls in Kentucky or elsewhere. As these breeders of stock-cattle often find their market as low down as Baltimore County in Maryland, they should make it a rule to keep themselves supplied with bulls from the noble herd of *Patterson's Devons*, near Sykesville, on the railroad between Frederick and Baltimore. There are none better than his in England, and, as a herd, perhaps not one equal to it in number. These cattle are of a genuine natural race, of middle size, very well put together, carrying perhaps more beef of the finest quality *to the acre* than any other breed—and of all others, except the Scotch Highland cattle, (which unfortunately have not been tried in our country) best adapted to the management and pastures which prevail in the Western Counties of Virginia and the Eastern Counties of Tennessee—while Kentucky and Ohio will do right to adhere to the Short-Horns as long as they possess such luxuriant pastures, and corn in such abundance for fattening them. But it may be doubted whether they would do so well in a region where—as west of the swarm of springs—they subsist their cattle, in a great measure, when the ground is covered with snow, on the *boughs of the sugar-maple*, which are felled in great numbers for that purpose. Knowing the capacity and inestimable value of the ox, as he is fondled and followed by the hardy farmer of New-England, I would not desire, Mr. Editor of *The Farmers' Library*, a better business—with a foundation of *Patterson's Devons* to go upon in East Tennessee and Western Virginia—than to raise *oxen*, to be broken and trained under the management of a Yankee teamster, and sent down under handsome yokes to be sold annually in the tide-water Counties of Maryland and Virginia—large, cherry-red oxen, that do their duty with unfailing accuracy, and by a sort of passionless instinct that is better than sense, since it *never mistakes an order*—such oxen, in a word, as readily command in the Eastern States \$100 per span. And why should they not, if you compare them with the horse, or even the mule?—the horse eating his hay and half bushel of oats, and dying at an average of ten, of the colic or the bots—the ox laboring day in and day out through the year, on grass or good hay, and at the same age giving you 800 pounds of good beef for your harness tub, without any cost but a year's holiday. Thus, instead of a total loss of your capital, the ox gives it back to you at the moment you take his life. I am aware of the objection urged by my friends at Winchester, as to their

slow motion, and have not time to discuss that point. For a dissertation that covers the whole ground of gearing, breaking and training, and their capacity and relative value as compared with the horse, I refer you to Stabler's valuable Prize Essay in the old American Farmer. As to the objection to the heat of the climate I can only say, as far as that applies to the high Counties of Virginia, that I have been rambling among them most agreeably since the first week in June up to this, 26th of July, and have but once seen the mercury as high as 82°—while the papers tell us it has been in Boston repeatedly above 90°—and nothing has more frequently occurred to me than how it would do a true farmer's heart good to see a Worcester County, Massachusetts, farmer, following one of Moore & Ruggles's, or Prouty & Mears's plows in the limestone Valley of Sheandoah, or along the stony mountain sides of Rappahannock, with his span of oxen, such as I have seen *back* a heavy cart up hill, steeper than that which leads directly up to the Warm Springs House, with *four thousand weight of stone in it!*—But I have been insensibly led away again from the line of personal observation prescribed for these desultory remarks, and must return to the subject of *grazing in the Valley*. The "stock" cattle are driven down the Valley from September to November, and are carried through the winter on wheat-straw and hay, and fattened on grass in summer. The average price of these stock-cattle last autumn was \$14 a head. Where they are designed to be sold in late spring or early summer, they are "*mealed*" through the winter, and always "*salted*" twice a week. They are expected to average 500 or more, and the general calculation with the grazier is to sell at from 75 to 100 per cent. advance on first cost; but to this first cost is to be added labor and interest on the value of the land, &c. Here is, undoubtedly, a much-neglected, nay, altogether unutilized branch of agricultural economy in the tide-water counties of Maryland and Virginia, where thousands of cattle might be reared on the marshes, and carried through the winter on wheat-straw and corn-fodder; and if not ultimately fattened they might, at three and four years old, be gathered into droves in early autumn, and driven up for sale as stock-cattle into Counties nearer to market, and where men have the enterprise to improve their lands and provide the means of fattening. I have no hesitation in believing that the tide-water Counties of Maryland might add one hundred thousand dollars of clear income to their present resources from the present source alone. But because the result in a single case might not justify the attempt, the amount not warranting the trouble, they have not the enterprise to *form a system*. But how can men be expected to *combine*, collectively, their judgment and resources, who have not been educated and trained *individually* to think, and to turn over and examine all the elements of success in their profession? True, for example, it might be no object for a single farmer, with no matter how much waste marsh land in summer, and wheat-straw and corn-fodder in winter, to add—as all such farmers might do—3 or 4 or 8 or 10 to the number of his young stock-cattle, because he might not expect a uniform and remunerating market at home, and so few would not bear driving to a distant one; but how easy to unite with his neighbors to make up, in the month of September, a drove of one or two hundred!—whereby, almost without a dollar's cost, that much enough to pay his taxes, or the blacksmith's or the grocer's bill at least, might be added to his income? But how much more exhilarating to attend a party caucus, and there listen to the slang-whanging of party demagogues, than to be studying the principles, and investigating the resources and materials of Agricultural Industry—its literature, and the natural history that naturally belongs to it! How much more congenial for Indolence to sit waiting for some lucky turn of fortune—to indulge in dreams of being some day poked into some sinecure office, than to be troubled with acquiring the various knowledge that appertains properly to the art of Agriculture, lifting it out of the mire, and elevating it from a mere laborious, toilsome drudgery to the condition of a high, noble, intellectual and accomplished pursuit?—Such men, though themselves without a spark of the right sort of ambition, cannot realize the truth that

Cato farming more independent feels
Than Cæsar with the Senate at his heels."

Though indignation always overcomes me when I think of the convenient and stupid doctrine of those who maintain that farmers have nothing to learn from books, (as if *knowledge* and experience ceased to be *knowledge* and experience

merely from being put in print,) yet you must allow me, as I go along, to make "practical application" of what I see—as in this case, it seemed not out of place, in speaking of the sources of supply of stock-cattle, to turn aside for a moment to inquire of the landholders of the tide-water and marshy river-shore districts of Maryland and Virginia, whether they too might not profitably supply thousands for the grazing districts of their States, and Pennsylvania? And now a word as to the

SYSTEM OF HIRING, FEEDING AND CLOTHING NEGRO LABOR.

The system of hiring, feeding and clothing colored people, as I was informed by the very respectable and intelligent landlord at Newmarket, is to collect at that place—for that County—on the first of January, those to be hired, and to put them up to the highest bidder, for the ensuing year, or to bargain more generally by individual arrangement. The person hiring gives his bond with good security to pay the hire at the end of the year, and the universal custom is to give two good summer suits, and one winter suit of clothing and to pay the tax-bill, which is assessed by the Court, so much for each slave of both sexes over sixteen years—also a tax called the "head tax," on all white men. The tax on white men, levied for county purposes, is from 75 cents to \$1 25. In this portion of Virginia and all west of the Blue Ridge, the system of *allowance* of meat to blacks is not generally practiced. Their labor and diet may be essentially identical with that of white laborers. On the eastern side of the Blue Ridge, the system of allowing is more generally kept up, and there the measure of meat is from 2 to 3½ pounds, with as much corn-meal or bread as they can eat, and in many cases a small allowance of salt-fish—herrings—of which they are fond, as the next most acceptable thing after *fat middling*, esteemed not much the worse for being a little *rusty*: reminding one in this respect of an estimable friend of ours, now dead—H. M. M. of Baltimore—who, constitutionally amiable and polite as he was gallant and accomplished, on paying a morning visit, the lady of the house evincing much distress at the bad behavior of a smoky chimney, observed, "I pray you, madam, don't be annoyed on my account. I rather like a little smoke!" I feel perfectly satisfied, after particular inquiry, founded, as may be truly added, in an habitual and unaffected solicitude on this point, that on the score of diet and labor, and substantial clothing and kind treatment, of the colored people in Maryland and Virginia, humanity has nothing to allege against their owners, with doubtless a few most reprehensible exceptions, as there are black sheep to be found in the best flocks. At Montpelier they all have well and richly cooked meals of corn-bread and meat, with vegetables and skimmed milk every day; each young negro child getting its regular allowance of a pint of fresh milk, that would make a full quart if it were to undergo the process of augmentation to which the fresh milk is generally subjected that is sold *as such* in all our large towns. It would be a hard matter to find, in all the Southern States, a single negro man—even a free negro—of whom it could be written as by the very intelligent London correspondent of that ablest and best paper in the Union, the *National Intelligencer*, as I read in the one of the 21st inst. The writer, himself, it would seem, a loyal but candid Englishman, says:

"The poor in England have suffered much from the failure of the potatoes, but the more intense suffering of the Irish has directed the mass of public attention and sympathy in that direction. I lately asked a working man (who had then constant employment) what difference the high price of potatoes made to him. He replied: '*Before, when I was in work, I almost always contrived to have a piece of meat on a Sunday for dinner, but I could not manage it the last Sunday, nor can I the next. We used to buy potatoes at 5d. or 6d. (10 or 12 cents) the peck; now they cost me 1s. 3d. (30 cents) the peck. I do think it hard that we cannot have a morsel of meat on a Sunday.*'"

As now I have scribbled as much as you would like to make room for in one number, I will have to reserve some account of the several Mineral Springs, with some notice of the grasses and the game of this portion of the State; and will therefore conclude this protracted letter with the general remark that it seems to me the good people have not sufficiently attended to changes of Husbandry suggested by the change in the commercial circumstances which *steam* has wrought in their position and pursuit as agriculturists.

There is, moreover, an almost universal neglect of *barn-yard and stable ma-*

nure, and all other fertilizers, except plaster of Paris and clover; conservative and valuable as these are, experience will finally reveal it as a great error to those who put their faith in these alone to sustain and improve their estates. Furthermore it may be added that the course and objects to which I would invite their attention, and which Nature seems to indicate—that of increasing their meadows, improving their pastures, raising more stock that may go on the hoof to market, and making more cheese, butter, and wool; giving to their capital and labor a more extended application in these directions—will have but imperfectly accomplished its legitimate and natural end, if it do not vastly increase their *stores of artificial manure*. The New-England reader, who gathers up the droppings of every beast of the field, and would save that of the birds of the air if he could, as if it were gold-dust—he who buys his corn from the South, and yet makes the hog that eats it pay for it with his offal, will scarcely believe that some farmers in Virginia who number of domestic animals more than a hundred, save scarcely manure enough for their kitchen gardens! Will he believe that vessels have loaded lately with ashes in Fredericksburg, to be taken to fertilize the soil of wide-awake, sharp-witted little Delaware? But *there*, you tell us, they freely patronize and read *THE FARMERS' LIBRARY*! In conclusion, Mr. Editor, allow me to subjoin, in the way of advice for the good people of Virginia—toward whom my heart has always had a scarcely less than filial yearning—a few homely lines:

"Cultivate little, but cultivate well,
Your crops alternate, if good produce you 'd sell;
Your soil manure often—the return it yields
Will tenfold repay what you spend on your fields.
Sow grass, too, at times, if you wish to make sure
Of having a plentiful stock of manure.
Without grass you've no cattle—without cattle, 't is plain,
You 'll have no manure and without that no grain."

MONTGOMERY COUNTY (MARYLAND) FARMING.

As being quite apropos to some of the topics treated in the preceding communication, particularly the use of *oxen* and of *lime*, we copy from the *American Farmer*, with particular pleasure, the following most edifying Letter, from one whom, in a sense of justice to the man, as well as of policy toward the agricultural interest, we have repeatedly characterized as a worthy fugleman in the march of improvement, by which his immediate neighborhood, (thanks to himself and the *friends* who compose it,) has for years been gaining more and more of enviable distinction. And how much more truly honorable in the eyes of all humane and well-judging men are the trophies thus won by the Plow, and by *mind* applied to peaceful Industry, than such as are stained with Christian blood in wars of invasion and conquest!

Every sentence, every line, of this letter has its moral and its value. Who indeed shall measure the value of the *examples* of men who thus demonstrate, in the face and eyes of the most incredulous and indolent, how small and exhausted farms, with means proportionably limited, may, by indomitable perseverance and skillful treatment, be brought ultimately to a high degree of fertility—and thus how Agriculture, as compared with other more attracting and fashionable pursuits, may be made to yield a comfortable living and a living profit on the capital and labor, and *intellect* employed! *Theirs* is a lesson for the millions—for it shows why and how men in ordinary if not in indigent circumstances, need not despair—need not abandon their little farms, however reduced, to go, in search of easier lives and better fortunes, either into the dangerous and corrupt atmosphere of large towns or into a condition of yet more corrupting and miser-

able dependence on the spoils and schemes of party. Mr. Stabler and his neighbors show, on the contrary, how—by inquiry, by the exercise of thought, combined with a hopeful temper and a resolute spirit to improve the gifts of a kind Providence—a barren may be converted into a rich soil, and the very desert be made to “blossom as the rose.” Yes, truly inappreciable is the lesson of those who thus prove for the honor of Agriculture that it is essentially an intellectual calling, which and when so pursued, will cause the poorest soil to repay honestly the small advances which the rich may vouchsafe to loan on the faith of its ulterior capabilities—and finally how it may yield to those who thus cherish it, the most respectable and independent sort of support that an honest man can covet or enjoy.

Mr. Stabler's was not the rare case of a farmer amply provided with the wagons, implements, and machinery; horses, mules and cattle—appendages of large establishments—with abundant capital to purchase lime, ashes, and guano; taking up a lot in one corner of a large farm and concentrating upon it the means of bringing it round from great poverty to great productiveness as quickly as, in the nature of things, poor land can be made rich, by strong judgment, the power of capital, and the use of all the fertilizers, animal and mineral; else, as he tells us, the great results achieved by him, in twenty or thirty years, out of his small beginnings, might have been more profitably brought about in less than a fourth of the time. It took him, as we see, seven years to realize the first visible melioration produced by lime—whereas if he could have had the offal of a large stock, together with ashes and bone-bust and guano at pleasure, a yet greater increase of crops might have been reaped in a single year or two, at most. But how few of those whose hopes and expectations and dependence rest entirely on the resuscitation of their soil, have it in their power to seize precisely the most favorable times and seasons for the various operations necessary in the process of an experiment, and, by the application of redundant force, get all the manures spread, and all the work done, exactly at the right time? Thus thousands of farmers may be slow, or even fail in the best designs at improvement, without being delinquent, or obnoxious to the charge of want either of judgment or industry. In the Eastern States—under a wiser policy which encourages a Free Trade in money, and where every County has its moneyed institutions owned in a great measure by, and identified with the landed and manufacturing and mechanical interests—any respectable and discreet farmer or mechanic can borrow the small sums necessary to give activity to his personal acquirements, industry and enterprising disposition; and here is, in fact, one great root of their growth and prosperity—but is it so with farmers and mechanics in Maryland, Virginia and the Southern States generally? On the contrary, how humiliating, and after all how precarious and uncertain, the expedients and solicitations to which *they* must have recourse to borrow the smallest sums for a time within which any course of industry, however unremitting and skillful, will enable them to refund it! Let them, the mass of small farmers, who inherit small, and for the most part encumbered estates, answer the question.

On the other hand, the demonstration of Col. Capron, as detailed in the “*Farmer*” and other journals, is one of quite a different character, showing how, by a judicious, energetic use of ample means and appliances of every sort in hand, the most unpromising and exhausted old field may, in the shortest possible time, be brought round to a state of extraordinary productiveness—repaying outlay, and leaving it in such condition that nothing farther is needed but honest

and judicious treatment, thorough tillage, and a rational rotation of crops to enable it in future to take care of itself, and maintain its own productiveness.

The Montgomery County improvements, of which Mr. Stabler's may be taken as a favorable specimen, illustrate the case of sagacious neighboring farmers—beginning with poor farms and no money, at a time when the roads that lead to success had not been so well explored; striking and depending in a great measure on their own lights, yet with constant vigilance detecting errors, and, after many years of new and doubtful experiments and toilsome progress, reaching the goal of their noble ambition, and planting beacons along their track for the benefit of those who might follow in their wake! Can any measure, it may be asked, of honor or gratitude, be too full for those who thus serve the truest and greatest Interest of their country, if agriculturists only had the discernment to distinguish, in merit, “the true from the sham”!—In the other case, Col. Capron, possessed of all the lights reflected on the great art of Agriculture, by modern experiment and discovery, and all the means necessary to the most successful practice, with equal judgment and vigor, exemplifies, to the conviction of the most skeptical, the truth of the principles and the soundness of the system established by the laborious and costly experience of the men of Montgomery—who, with many others, have so efficiently assisted, for the last thirty years, in taking the sounding and laying down the chart for agricultural improvers.

But different as are the two cases, both have their exceeding merit and usefulness, in their way; while each addresses itself to very different classes—friend Stabler's to the thousands of American cultivators in circumstances more or less straitened, who need the encouraging influence of such examples to save them from despair—Col. Capron's speaks to the opulent and incredulous stock-jobber and money-changer, who worships the “almighty dollar,” and who cannot be persuaded, but by such knock-him-down arguments as the Colonel's, that dollars can be plowed or dug out of the ground. If, then, his success should have the effect of turning to the country and to its noble and useful pursuits the minds and the means of wealthy drones, who are lounging away their unconsequential lives in the towns, dreaming only of sensual enjoyments and sordid accumulation—if it should, as it ought, have the effect of demonstrating to those men of overgrown fortunes bought with a wedding-ring, that their sons might find honor, and entertainment, ay, and *profit*—which many rich men like so much better—in practical Agriculture; should he thus turn to the country that current of capital and enterprise and labor which, under the influence of partial legislation, sets in all quarters away from the land into towns and manufactories, he will entitle himself to stand even yet higher than he does among the friends of the Plow.

After all, what the landed interest needs is, first, an earnest exercise of the mind, to understand the principles, practical and political, on which its success and prosperity depend, and then the *command of capital*, which is as much needed for the profitable manufacture of wheat, and oats, and corn, and tobacco, and cotton, and sugar, and rice, by the materials, power and machinery employed in their production, as it is to manufacture cloth and paper out of wool and rags. The published results of Col. Capron's experiments seem indeed emphatically to say thus to the capitalist of the City: “You, Sir, want respectable occupations for your sons, and the land needs the use of your surplus wealth. A *farm*, enough for your purpose, may be had almost for the asking. There it lies, like the hull and masts of a noble ship, at your wharf, already made to your hands; she requires only money to buy the sails and rigging, and to stow her

hold with flour, or tobacco, or rice, or pork. Without these, valuable as she will be, when thus equipped and laden, the hull *per se* is of no account. But furnish and fit her out, and place a skillful commander at her helm, and she will go abroad, and return laden with the produce and manufactures of foreign climes that will amply refund you principal and interest. Just so, and with yet more uniform certainty, will a farm make remunerating returns, if you will in like manner fit it out with adequate and suitable buildings, teams and implements—plow it deep and manure it well, as Col. Capron did; in a word, stock and man it well, and put it under the direction of a man of energy and skill, and it will pay you as the ship does—not, perhaps, sometimes, so much, but always a saving profit, without danger of being foundered or captured, and without the cost of insurance. Say, then, ye men of fortune, to your sons: ‘Here! instead of dragging out your days in tedious expectancy and idleness, oppressed with ennui, and impatient for my shoes, take as much now of that which must be yours at my death, as will buy you a snug farm in a neighborhood of honorable, industrious men; furnish it with good and substantial buildings, implements and working power; ditch and drain it; prepare your meadows and plant your orchards; study the principles of your pursuit in books that explain the philosophy and papers that record the results of all agricultural operations. Make yourself familiar with the mechanical principles of all your implements, and the philosophy of the best rotations in farming; scrape acquaintance and cultivate intimacy only with neighbors—rich or poor—of sound character and judicious practice, whose honor and industry have given them credit and power to rise from indigent or moderate circumstances to competence and public esteem. Treasure up their maxims and observe their management. Renounce, my son, in a word, a life of inglorious indolence, and expectancy from the future, for one of active and honorable usefulness. Go, and let the means which avarice would teach me to withhold, transform you from a shapeless and loathsome grub into an active and useful member of the great hive of social humanity.’ ”

Such ought, and such, to a certain extent, we may hope will be, the effect of Col. Capron’s demonstration of the improvability—the restorability, if we may say so—of land out of which the blood and very marrow of life had been worked, by processes which everywhere and to the end of time, will lead to that result, as certainly as cutting open the goose will cut off the daily supply of golden eggs.

We should like to see an agricultural survey of the economy, conduct and products of another and a *large* estate in Maryland, brought round by its own resources, anticipated, it may be, but if so, refunded—one which has been within a few years shaken out, as a lazy beggar from his rags and filth, into comeliness and activity. If not to be had otherwise and better, we will some day take the survey for ourselves. It is an estate on “West River,” of probably 1,000 acres, with a large force, yet which, at the death of its late owner, did not more than make “both ends meet.” Being wisely placed by its benevolent owner under a manager who has a genius for managing labor and improving land on a large scale, he has caused the whole estate to assume a fresh, thriving, fruitful aspect, and to yield to its present owner some ten thousand a year:—all this the fruit of a clear judgment and provident forecast, and discipline tempered with humanity—and, being so tempered, they always promote and sustain each other. Need we say that we allude to the old “DODEN” estate, under the care of JOHN CRAWFORD?

P. S.—It need hardly be added, that in such surveys nothing should be extenuated. The account and the results, the outlay as well as income, the loss as well as the profit, should be fully and fairly stated.

SANDY SPRING, 6th mo. 8th, 1847.

Esteemed Friend—H. CAPRON: In complying with thy request to furnish some notes of the method adopted to improve my farm, I should first, perhaps, give some general idea of the kind of soil and condition when it came into my possession.

The under stratum is a stiff, tenacious clay, making good "brick without straw;" and the soil itself, like most of the lands in this section of country, had been worn out or greatly impoverished by "the old Maryland plan" of raising alternate crops of corn and tobacco; and what little fertility was left in it after the tobacco culture ceased, (because the land was too poor to produce remunerating crops any longer,) was, by a long course of tenantry, pretty effectually used up; this was certainly the case with my farm of little over 100 acres. An able-bodied man, owning the land and doing all his own work, might possibly make a trifle over a bare support; but I had not this advantage, being compelled by ill health to resort to the country, and abandon the pursuits for which I was educated.

I knew literally nothing about farming, but did not doubt that by plowing in green crops, &c., &c., my poor old fields could soon be made productive. Like many wise men, however, I found this plan of "renovating worn-out lands" much easier in theory than practice. There were two strong objections in my case to this method—a good one though it is, under favorable circumstances. My land was found, after repeated trials, too poor to produce the green crops to turn in; and it was also necessary, in the mean time, to grow something to live on, for I had not the money to spare to buy with.

I used plaster by the ton, but with no apparent advantage; nor was I much more successful in adopting General Beatson's plan of burning clay.

My first and most important change for the better was the substitution of oxen in place of horses, for all farm-work—plowing included. I found that two yoke of oxen could be better kept, and at less than half the expense of one pair of horses, to say nothing of the wear and tear of harness; by proper management each yoke plowed nearly as much as the horses, even in hot weather; and after working 4 to 6 years, were worth about first cost in beef.

The next experiment was the application of a few hundred bushels of shell-lime, hauling the shells *twenty miles*, and burning them on the farm; and although a *heavy business* with my slender resources, I should have persevered, but for an accidental circumstance.

About 18 years since, an individual who owned a lime-kiln in an adjoining county, offered for an advance payment to furnish 200 bushels of stone-lime for \$20—the refuse of a previous kiln, and air-slaked.

This 200 bushels was applied to four acres (on one side) of the poorest field I had; and was, I believe, the most extended experiment then made in the neighborhood with stone-

lime. Some two or three persons had experimented on a small scale; one of which only had applied as much as a *load* of lime; and in no instance, as far I could learn, was the application repeated, for none appeared satisfied with the results obtained.

After four years very little change was perceived in the vegetation—nearly all the grass sown with the small grain having perished—nor was it to be wondered at; for the crop of corn, grown at the time of the application of the lime, did not yield *five bushels* of merchantable corn to the acre—most of the oats, succeeding the corn, was too short to harvest.

After seven years, this field coming again in course, was planted in corn—the season most unpropitious; yet without the addition of a shovelfull of any other kind of manure, the yield was generally estimated at 30 to 35 bushels per acre; on the adjoining land, not limed, the product was still about four to five bushels—the part adjoining, as also the four acres, had 80 bushels of lime for this crop, (making 130 bushels to the acre for the portion previously limed,) but the application was so recent that no effect was perceived in the crop, and the increased fertility of the four acres was attributed entirely to the previous dressing of 200 bushels.

Corn that season readily sold for \$1 per bushel, as the failure in crops was very general; and according to the best estimate I could make, this single crop more than five times repaid the whole cost of the lime and interest of the money expended. The succeeding crops of small grain *could be harvested* very readily. The clover *now* began to grow, and the plaster to act; as the soil was comparatively light, and even changed in color, by the action of the lime. The clover seed, a good crop, was clear profit, and it was the first I ever cut, or was ever likely to cut, on the "old plan of farming," (even with the most "dogged perseverance, untiring patience, and hard labor," guided by all the "skill and judgment" that I possessed,) which, as I understand it, is "making the soil improve itself, while it yields a support." This may be effected with even ordinary skill and judgment, where the land is not too much exhausted, and with other resources to live on in the interim.

But to return to the lime, which, to use the identical words of a neighbor who examining my experiments, appeared to be my "only chance of salvation" in farming.

These results were sufficient to satisfy the most incredulous; and induced me, as well as some of my more enterprising neighbors, to lime as freely as our (generally) limited means would admit of.

For a considerable quantity of lime I paid 18 to 20 cents per bushel, and hauled it six miles; then had it delivered at 24 cents per bushel—but as my resources increased, both from the improvement of the farm and otherwise, I found that a better business could be done by burning the lime on the farm. With this view I purchased a quarry, paying at the

rate of five hundred dollars per acre; and subsequently a second one, at the rate of eight hundred dollars per acre—being more accessible on account of the road; though both about five and a half to six miles distant. The stone is now hauled and burned at our leisure, which is of material advantage, as previously the convenience of the seller was alone consulted, be the state of the roads as they might;—all *cash* expenses included, my lime does not now cost me over about 5 cents per bushel.

We all know that with ample means at command, the same degree of energy and perseverance will attain similar ends in much less time; and I feel confident that, with my present experience and resources, I could just as certainly, and more profitably, have effected the same or even a much greater degree of improvement, in one-third the time, than was necessary under existing circumstances.

"No calling prospers without industry and perseverance," and those who are deterred from the attempt at improvement in a small way, because they have not the resources to begin on a large scale, are not very likely to improve at all; and were I to venture upon giving advice, it would be to make 20, 10, or even 5 *acres good*—for even the most limited resources may accomplish this much; this will afford the means to improve another five-acre lot, and, as the improvement advances, though at first by almost imperceptible degrees, the difficulties will gradually disappear and vanish; and if not literally reducing the "mountains into mole-hills," they may be passed over with comparative ease.

So far as my observation and limited experience extend, lime will improve *all* stiff clay soils; and if, instead of plowing it under, it is applied to the surface one or two years in advance of the cultivation of the field, so that the winter's frosts and rains may act upon and dissolve it, the farmer will not generally have to wait seven, or even five years, for a return. *Lime should be kept near the surface, and incorporated perfectly with the soil.*

I neither profess nor possess any more "skill and judgment" than many of my enterprising neighbors, though possibly *necessity* has compelled me to exert rather more energy than some others.

Now can it be supposed that in liming to the extent we have, and "using the highly-concentrated and bought manures," such as Guano, Poudrette, Bone-Dust, and Ashes, we do not find our account in it? We *know* that by a judicious application of them all, the outlay and interest are repaid by the *increased* product, and the land improved thereby much faster than without such aid. Last season we undertook to make up a Club for obtaining 50 tons of Guano, and get the discount; and I very soon had the names for 38 to 40 tons, without going a step out of my way.

Putting "dollars and cents" entirely out of the question, the reflecting mind—certainly an admirer of the beauties of Nature—must derive more satisfaction in witnessing his once barren fields clothed with verdure, and on reflecting that at least in some degree the change was wrought by his own exertions.

As it appears to be the "fashion" to illustrate by anecdotes, I will close these desultory and hasty notes by the relation of one, and in very few words. In raising my barn in 1822—quite a large one in those days—one of the assisting neighbors remarked that he was astonished to see me spend all my money in erecting so large a building, as one of one-fourth the size would hold all I ever could grow on this farm; and if it ever *was filled*, it must be by *flint-stones*!! which were, in fact, about as thick as the *blackberries* on every field. Mainly by the liberal use of lime, and with the "highly concentrated and bought manures" as adjuncts, I *have* filled it to overflowing, as also a large addition, and had to "stack out" besides. True, the flint-stones did aid, but it was by an extended course of under-draining, which was found to be as necessary as the use of lime. What I have done any one may do. To show still farther the onward strides at improvement in this section—proverbially barren and unproductive—I will only add that when I began my liming operations there were but three kilns within some 12 to 15 miles, and all in another country. Now there are twenty-seven within about six miles, nearly all of which are on the farms of the owners, and erected for agricultural purposes.

Thy friend,
EDWARD STABLER.

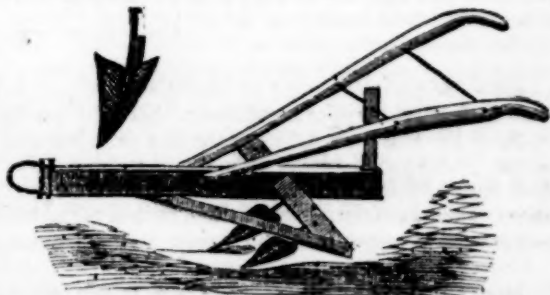
A CULTIVATOR.

SANDY SPRING, 6th mo. 15th, 1847.

To the Editor of the American Farmer.

Inclosed you will find a rough draft of a Cultivator, that is superseding all other kinds in this neighborhood. The tooth is simply a small shovel turned outward with the point a little hooked. The middle tooth passes through an iron strap, fastened on the lower side of the beam, and secures the cross-piece by passing through it—the more oblique the cross-piece the better we have found them to work. I will not conclude, after the manner of some of your cor-

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respondents, who very kindly and with wonderful disregard of self, praise an agricultural

implement in the highest terms, and then inform us that it can be obtained from themselves—but will conclude by stating that al-

most any farmer familiar with tools (and all farmers ought to be) can make one without difficulty. A MONTGOMERY FARMER.

From the (London) Mark-Lane Express.

THE GIANT SAINFOIN.

Sir: Having received numerous communications from different parts of the Kingdom, requesting farther information concerning the Giant Sainfoin (as the introducer thereof has styled it,) I avail myself of the opportunity which your journal affords of replying to them *en masse*, and in so doing I shall confine myself to what has passed beneath my own observation.

The introduction of the variety, as your reporter states, was purely accidental; it was clearly a foreign species, but although various purchases of foreign seed have subsequently been made, in hopes of obtaining the same variety, they have hitherto proved unsuccessful. It was not until the year 1842 that my father, who was the then tenant of the farm I occupy, sufficiently overcame his skeptical notions in reference to its peculiar properties as a distinct species, as to induce him to give it a fair trial. Then, however, he procured of the introducer four bushels of seed, which cost him 80s. per bushel. This was dibbled between the rows of wheat sown upon a pea stubble; and, the seed being expensive, care was taken to drop only one seed in each hole, at intervals of from three to four inches, by which means nearly three acres were planted. The stubble was left upon the land for protection during the winter, but beat down, raked, and carted off in the spring. The crop was good for a thin plant, and would have cut more than 30 cwt. per acre; but my father, hoping to get two crops of seed, let it stand, which was injudicious, experience having proved that it is exceedingly tenacious of going to seed in a maiden crop; the second crop, although it went to seed again, was too late to be successful. In 1844 the entire piece was mown for hay, and produced from five to six tons; early in September it was mown again for seed, which produced about twenty bushels per acre. This was sown in 1845 upon a red loam with a chalk subsoil, after beans and peas, which

had been well manured for the same, at the rate (by way of trial) of two, two and a half, and three bushels per acre, upon about 24½ acres of land, which have this season produced more than fifty tons of hay; the part sown the thickest answering the best. In August it was mown again for seed, and subsequently produced a good eddish for feed. The species has now been tested in this and the adjoining parish for fifteen years, and the price of the seed has varied during that period from 50s. to 80s. per bushel. It is quite clear that it will, like lucern, produce three crops for hay or soiling in one season, and the food in either case is much more nutritious. I have twelve acres, drilled last spring upon pea-stubble wheat, at three bushels per acre; the wheat was very fine, and partially down, but the plant is good. I shall now introduce it in regular course, sowing about twelve acres in each season upon pea-stubble wheat, to remain three years, and then break up for wheat, by which method your agricultural readers will perceive that only the barley crop will be sacrificed in one round. In this way I shall obtain thirty-six acres for hay in each year, and thirty-six acres for seed, or for second and third crop, as may appear most advisable. This will furnish me with all the hay I shall require, leaving my closes wholly for sheep feed; but whether this will prove the more excellent mode of turning this peculiar variety to the best account, experience alone can determine. I shall only add that I have still a very large portion of my crop of hay remaining, and a small quantity of the seed in an unthreshed state, with thirty-six acres in plant, and should any of your readers who are curious, or feel interested in the cultivation of the plant, pay me a visit, I shall be happy to see them, and will furnish them with any additional information I possess.

I am, Sir, your ob't serv't, JOSEPH HINE.

Neenham, near Baldock, Feb. 19, 1847.

TO PREPARE BEESWAX.—To obtain wax, boil the combs in a strong muslin bag, in a saucepan, with water sufficient to keep the bag from burning; and while boiling, continue to press the bag with a wooden slice or spoon, to extract the whole, as you skim off the wax. Drop the wax into cold water, where it will swim on the surface. The wax thus obtained will still want refining, to effect which, place it in a clean saucepan and melt it over a slow fire. Then pour off the clear wax into proper vessels and let it cool.

NICE CREAM CRACKERS.—One pint cream, six eggs—beat the whites to a froth; if the cream is sour a spoonfull of saleratus must be used. Mix the dough very stiff and pound it half an hour.

LECTURES ON BOTANY.*

COURSE OF LECTURES ON BOTANY IN REFERENCE TO AGRICULTURE.

By CHARLES JOHNSON, Esq., *Professor of Botany at Guy's Hospital, &c. &c. At Messrs. Nesbit's Agricultural and Scientific Training School, Kennington Lane, Lambeth, near London.*

LECTURE II.

OUR preceding Lecture was dedicated to the detail of a few of the advantages that have already resulted from the knowledge of a simple fact in vegetable physiology, namely, the influence of the external organs or parts of the flower in the production of the seed. It is a subject on which we might dwell at much greater length, as manifesting the vast importance of a branch of study that the practical cultivator, regarding it generally in the light of an abstract science, has hitherto considered rather as an amusement for the idle speculator, than as intimately connected with the practice of his profession, and illustrating those processes of his art that have been established by the slowly accumulated experience of himself and his predecessors. But this early stage of our inquiry is not the fitting place to extend our remarks upon the action of organs whose operation can scarcely be comprehended without reference to their own ultimate structure—in other words, to the minute organs or vessels of which they are themselves built up; and this observation applies not only to the flower, but to every part of the vegetable fabric: every product of the plant, whether cultivated for food or as adapted to the other almost innumerable wants and purposes of man—nay, its very existence—is dependent upon these.

A vegetable is a living being, and, as such, is made up of parts or members, all more or less influencing each other, and united and simultaneous in their operations for the growth and preservation of the whole. Some parts, when cut through, appear solid to the naked eye, others present a minutely porous appearance; but under a microscope or strong magnifying-glass the apparent solidity of the hardest and closest wood disappears. It is in these small and all but invisible cavities that the vital functions of the being before us are to be traced; it is here that are elaborated the starch, the gluten, the gum, the sugar, and the other proximate principles of our food; here are formed the tannin, the dye, the medicine; the production of the wood, the bark, the differing fibre of the flax and cotton, and the increase of the universal substance of the plant itself, are all of them processes dependent upon the economy of these mysterious recesses. The prying eye of curiosity is sometimes at fault in its endeavors to penetrate the sources of organic action, but a glance is often sufficient for the speculative

mind of man to work upon and form a hypothesis which a second will enable him to improve into a theory, and although we positively know but little, that little enables us to assume a great deal, and this is especially the case as regards the science of Vegetable Physiology, or that which treats of the natural laws regulating the growth of plants and their productions, as just referred to. In giving you a general outline of the action of these laws, and endeavoring to explain the structure through which they operate, I shall avoid as much as possible reference to what is merely supposititious, relying upon the statement of facts, and such conclusions as, though in our present state of knowledge they are incapable of being positively demonstrated, are still so closely accordant with what we really do know, that, until they are contradicted by facts, we are justified in regarding them as such themselves.

Divide the stem of any common plant transversely or crosswise, and examine the section with a microscope, it will present the appearance of net-work, the meshes of which are of various sizes and figures, some perhaps regularly hexagonal, or six-sided, like the cells of a honey-comb, others more irregular, others square, and some circular; the circular ones are generally disposed in groups, which are sometimes scattered, sometimes arranged at corresponding intervals in a concentric manner. If we divide the same stem perpendicularly, or lengthwise, we find the angular meshes presenting a nearly similar appearance, showing them to be small, membranous cells or cavities, while the circular ones are discovered to be sections of little tubes, more or less elongated, and narrowing toward each extremity so as to terminate in a point, and farther that they are disposed in longitudinal layers, or thread-like bundles. These cells and tubes are denominated the elementary organs of the plant; and minute examination of them shows that, independent of differences in form, size, and disposition, they vary greatly in structure, and are probably subservient, in consequence of that variation, to the performance of different functions; these functions, however, are, in our present state of knowledge, very imperfectly understood; of many, and those perhaps the most important, we are altogether ignorant; while others are little more than surmised from their apparent connection with some obvious fact in vegetable growth, such as the

* Continued from page 377, Vol. II., *Monthly Journal of Agriculture.*

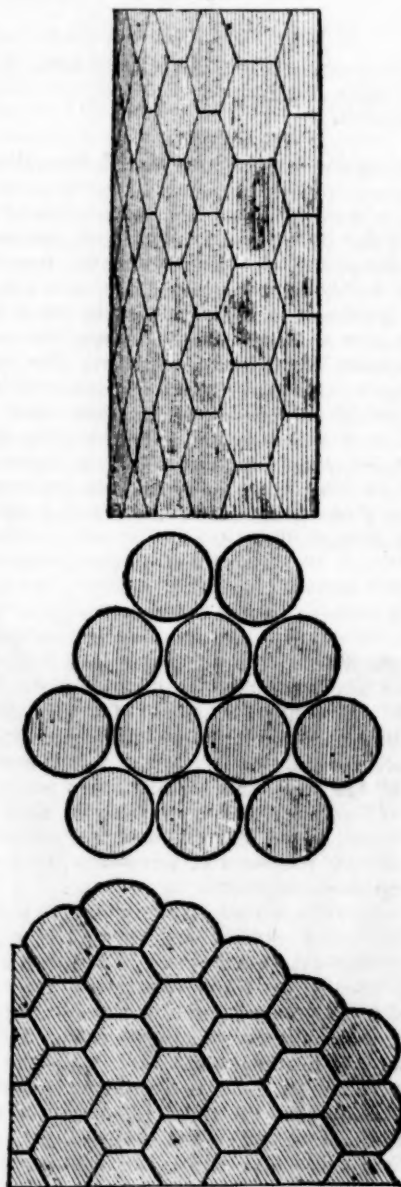
rise and distribution of the sap, &c. So very minute are the elementary organs of plants individually, and so obscurely revealed are their physical phenomena, even with the assistance of the most powerful microscopes, that few observers agree in their accounts of either, beyond the admission of certain general facts.

The simplest definable form of the vegetable tissue or substance appears to be the cellular, namely, that presenting in division the angular meshes just referred to; each of these meshes is the section of a cell, consisting of a very delicate transparent membrane, rudimentally globular, but assuming different figures in consequence of being pressed upon by others in the growing plant; when equally pressed on all sides by similar cells, the globe becomes twelve-sided, and of the form denominated by mathematicians the rhomboidal dodecahedron, which being divided in either direction, presents a hexagonal outline, resembling the cells of a honey-comb; where the pressure is unequal, the regularity of the cells is variously affected and distorted, and they become more or less oblong and rectangular, or present such a diversity of figures in different plants, and in different parts of the same, that the delineation of them would require a far greater space than our confined limits will admit, or the subject before us justify the dwelling upon, where a hasty outline will answer the end proposed, without entering into minutiae belonging to the more abstruse and philosophical portion of the science. Cellular tissue constitutes a very considerable portion of the substance of all plants; the pith is wholly composed of it; so is by far the greater part of the bark, and the external covering of the more delicate organs; while, filling up the interstices left by the disposition of the woody and other tubular tissue, it seems to be almost analogous to fat in the animal economy, and, like that, increases so much, under certain circumstances, as to alter materially the general aspect and condition of the plant; it is indeed that part of the vegetable fabric that is the most influenced by cultivation. The magnified views in fig. 1 will convey some idea of the arrangement of the cells, and especially of the origin of their angular outline, which is very beautifully seen by the assistance of a microscope, or even by a good magnifying-glass, in a thin transverse slice of the stem of the common raspberry, or that of any other plant in which the pith is not invested by a very thick cylinder of wood. The size of these little cells varies from the fiftieth to the thousandth part of an inch in diameter, their average bulk being about midway between these estimates. In the earlier stages of their existence they are filled with a fluid in which a multitude of little colored bodies, only visible under a very high power of the microscope, are seen floating with greater or less rapidity—a phenomenon apparently as intimately connected with that of vegetable life

as are those of the lymphatic and arterial canals to animal existence.

Cellular tissue has been justly denominated the basis of the vegetable fabric. The sim-

Fig. 1.



CELLULAR TISSUE.

plest of all known plants exists as a single globular or oval cell; those a degree higher on the scale are composed of similar cells, more or less elongated and attached end to end like the beads of a necklace; then come others more complicated by the attachment of cells in breadth as well as length, the lower or meaner of which present mere shapeless or irregular masses, while the remainder of the series, ascending by successive grades of structure, may be traced by the eye of the naturalist through a thousand varied and improving forms, so beautiful, so admirably

adapted to the fulfillment of the offices allotted to them by Providence, as to force themselves upon the attention of man, though too distantly connected with his immediate interests to admit of his due appreciation of their value. Under myriads of modifications, which our space will not permit us to investigate, this tissue constitutes the whole substance of the lichens, sea-weeds, mosses, and other allied and equally neglected families of plants. However different in appearance such cells are from the little tubes with which they are found associated in all the nobler classes of vegetation, there seems at present to be scarcely a possibility of question that the latter are not merely the results of their super-development; in other words, that the tube, under whatever form it may exist, is but an elongated cell, or the breaking of the cavities of several into one. These, however, are speculations that we may hereafter refer to more particularly; let us look previously at the tubes themselves, and note what is known or understood respecting their uses in the economy of the growing plant, and first at those which compose the principal substances of the wood, its harder and tougher portion, called woody fibre.

Fig. 2.



WOODY FIBRE.

If the diameter of the cells just described is so small that without assistance from the microscope we are generally unable to distinguish their cavities, that of the woody tubes is frequently much less, and in some plants not more than the five-thousandth of an inch. Fig. 2 represents a small fragment

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of oak wood highly magnified, showing it to consist of such tubes closely disposed upon each other, so as to occupy the smallest possible space, and leave no openings between them, the narrow, tapering or attenuated extremities of each generally lying between the broader portions of those that lie around them. These tubes extend in the form of continuous bundles or layers from one extremity of the plant to the other, sending out branches into the leaves and other subsidiary organs, and giving strength to, and maintaining communication between all its parts; they constitute the channels through which the sap ascends and is distributed, a fact readily ascertained by cutting into the stem or branch of a vine, birch, or any other tree in the spring, when that fluid may be traced as flowing from the mutilated vessels of the wood. The passage of the sap through this medium, though certified by long observation and repeated experiment, would appear to those who examined the vegetable texture for the first time, or without a previous acquaintance with the natural phenomena connected with organization, as an inexplicable mystery, no apertures being discernible under the highest powers of the microscope, through which the cavities of the woody tubes communicate with each other. The discovery, however, by Mons. Dutrochet, of the permeability of vegetable and animal membranes, or that they are capable of transmitting fluids through their substance, although destitute of any apparent passage of communication—a phenomenon to which he gave the name of *Endosmosis*—has contributed greatly to the elucidation of this and other physiological facts, that were as stumbling-blocks to the philosophy of our forefathers. The demonstration of this important fact is easy, and within the reach of those even whose means of scientific inquiry are the most limited, as instanced in one of the earliest experiments of Dutrochet himself: he filled the swimming-bladder of a carp (any other small bladder will answer the same purpose, and any fluid heavier than water) with a thin solution of gum, and, placing it in a glass of water, observed that the bladder swelled out and became heavier, in consequence of the water being attracted through its substance by the weightier fluid within: he reversed the experiment by filling the bladder with water, and placing it in the mucilaginous solution, under which circumstances it lost weight, by the water passing out instead of in. It was afterward ascertained by numerous experiments that plants placed in water draw it up through the thin tissue of their cells and woody tubes, and acquire a great increase of weight, which they lose again, at the will of the experimenter, by simply adding to the water in which they stand some soluble substance, sugar, for instance, that renders it heavier than their contained juices. The force of this attraction, and of course the facility with which the fluid passes, is very

considerable; water holding half its weight of sugar in solution raised pure water through membrane with a power capable of sustaining the pressure of a column of mercury of 127 inches in height, a power nearly four and a half times greater than the pressure of the atmosphere which sustains the mercury in the barometer and raises the water in a common pump. On the cause of this curious phenomenon philosophers are not agreed: it is probably only one of those numerous instances that are from time to time brought to light by inquiry into the hidden processes of Nature, of the general tendency of matter to maintain an equilibrium among its particles; but the permeability of the vegetable membrane being established, it is not necessary to our present purpose to pursue the subject farther: we have only to consider, as a natural consequence of the development of the living plant, that the sap becomes thicker as it ascends from the root, drawing after it the thinner and more recently imbibed fluid, to account for its successive rise through the minute vessels above described—a rise so rapid that several quarts or even gallons are obtainable daily for weeks together by tapping the trunks of some tropical trees.

The fibre of hemp, flax, and of many other plants employed in different parts of the world in the manufacture of cloth, cordage, &c., consists of these woody tubes; and some idea of their extreme tenuity may be formed from the examination of the finest flaxen thread by a microscope, which shows it to consist of a considerable number of tubes. The membrane composing them, though delicate and transparent, possesses much strength and elasticity in most plants, and in all cases is greatly superior in that respect to cellular tissue, the membrane of which is comparatively brittle; the difference in the strength of cotton and linen thread is an instance of this, the former being cellular, the latter woody tissue. The wood of the fir tribe appears to be very dissimilar to that of ordinary trees and herbs, the tubes being marked with dots or apparent pores, surrounded by a series of concentric circles; similar markings are observable in the woody tissue of a few other tribes, but only such as, like the plants in question, produce aromatic or resinous secretions, whence they have been generally regarded as glands; their structure is, however, at present very imperfectly understood, and not anything is known respecting their functions; if really openings, they constitute a remarkable exception to the closeness of the corresponding tissue in other plants.

The name of duct has been given to various comparatively large tubes or vessels, generally associated with those of the wood, but always distinguishable from them by their greater diameter. The large pores, frequently observable by the

naked eye in a transverse section of wood, are the divided cavities of the vessel so called, which are sometimes distributed through the layers of wood, but more commonly form themselves distinct layers or bundles. Many vessels of different structure have been confounded under the general name of duct; and being wholly unacquainted with their offices in the economy of the plant, much diversity of opinion exists among physiologists respecting their classification and relative uses. Some are angular, and very evidently formed by the breaking of cells longitudinally into each other, or by the absorption of the dividing membrane; others are dotted with apparent pores; a third kind are more or less distinctly marked with spiral lines, sometimes continuous, occasionally broken at irregular intervals, as though a spiral thread contained within a membrane had had its coils separated and ruptured in places by the longitudinal growth or extension of the membrane; a fourth series, called annular ducts, consist of concentric rings, or perhaps of the coils of spiral threads so broken as to present the appearance of such, and held together by the membranous tube containing them. These larger tubes are disposed in a similar manner to the smaller ones of the wood, and resemble them in being more or less narrowed or conical at their extremities: several of their forms, and there are some intermediate between those described, approach so nearly to the following form of tissue, that it is difficult to conceive

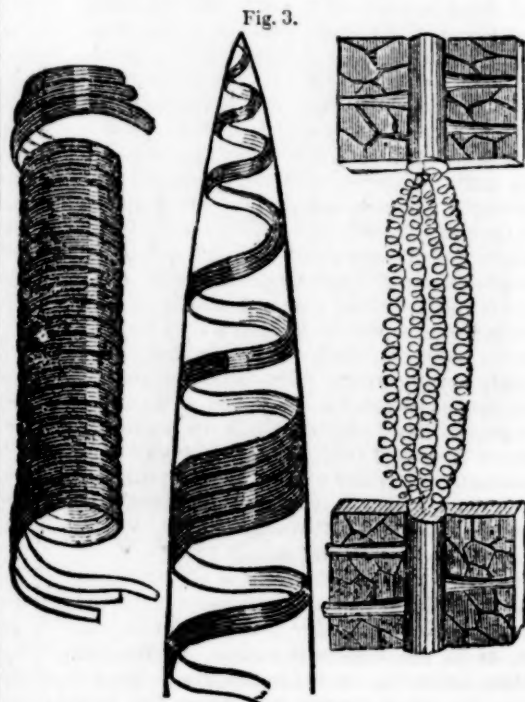


Fig. 3.
SPIRAL VESSELS.

them other than more imperfect or disurbed modifications of the same, viz., the spiral vessel.

This last form of the vegetable elementary organs consists of one or more filaments coiled spirally within a very delicate membranous tube, similarly attenuated toward either end as are those of the wood and the duct, but, unlike the spirals apparent in some of the latter, capable of being drawn out like a spring, when the part containing them is broken. They are very advantageously seen by breaking carefully across the leaf of a rose or strawberry, or the young brittle shoot of the rose, and drawing the parts slowly asunder, as exhibited in fig. 3. The spiral coils are in most instances so close together as to appear to form the tube, and the membrane which invests them is so exceedingly fragile as to break between each coil of the spire when it is drawn out, so as not to be readily discernible unless occasionally when the extremity of the filament is relaxed, as represented in one of our figures. Each spiral is generally composed of a single filament or thread, but in some plants the number of parallel fibres twined in the same direction is considerable; one of the figures exhibits a magnified view of a portion of such a vessel from the stem of a banana, consisting of three threads or fibres; but in this, and many other plants of the same and allied orders furnished with compound vessels, there does not appear to be any regularity in their production. De Candolle remarks that the number of threads composing each spiral of the plant just referred to varies from seven to twenty-two; but they are sometimes formed of a single thread, and I have found in the same portion of the stem no fewer than eleven different modifications of these curious vessels, varying in the number of their threads from two to twenty-nine, the largest number which has, to the best of my knowledge, been met with in any plant. The size or diameter of the spiral tube is exceedingly variable, the largest being about the three-hundredth or four-hundredth of an inch, while in some cases they are not above the two-thousandth or three-thousandth. They are variously distributed, but chiefly in the young stems or shoots, in which they occupy that cylinder of woody substance that immediately surrounds the pith, called the medullary sheath, and in the stalks and veins of the leaves and other organs which are modifications of them and originate from the sheath in question. They are of very rare occurrence in the root, and still more so in the bark and the true wood, or that which in after periods of growth forms around the first year's layer. Where the tissue of the stem is not stratified, and the pith or cellular substance does not form a separate cylinder or column in its center, as in the liliaceous orders, palms, and others belonging to the same great natural class, the spiral vessels accompany the bundles of woody fibre and ducts that lie dispersed through its mass, and are present often in such abundance as to constitute the most remarkable feature in their internal structure;

from the stems and bases of the large leaves of the banana and plaintain they may be drawn out by the handfull, and in the West Indies are sometimes collected in this way for tinder.

The use of the spiral vessels in the vegetable economy is, like that of their other minute organs, rather to be surmised than demonstrated. A very general opinion, from the earliest period of their discovery, regarded them as organs of respiration; hence their denominations of "trachea" and "trachenchyma," alluding to their supposed correspondence in function with the trachea (or windpipe) and air-tubes in the lungs of an animal; to those of insects their structure presents a remarkable parallel. They are generally filled only with air; and although instances may occur in which they are "gorged with fluid," such instances are rare, and probably either accidental, or arising from one of those morbid changes to which the minuter portions of the vegetable fabric are unquestionably liable, although their causes are hidden in consequence of our imperfect knowledge and slender means of inquiry. The opinion, however, founded only upon analogies that may be rather fancied than real, seems of late years to have been gradually losing ground in the estimation of some of the best physiologists, although they have been hitherto incapable of substituting a more plausible hypothesis; and the principal argument that can be adduced against that previously entertained, consists in the fact that the spiral vessels of plants are not in immediate connection with the surface pores or stomata, nor even with the air-chambers with which the latter communicate, and hence differ from those accompanying the breathing apparatus of an insect. When, however, we reflect upon the permeability of the vegetable membrane to a comparatively gross fluid like the sap, the passage of one so thin and infinitely more diffusible as air can scarcely be denied, even though it had to penetrate to a much greater depth than to the interior of a leaf, an organ the structure of which is so strictly accordant with its supposed and almost experimentally-proved function as the vegetable lung.

Under whatever conventional name the elementary organs are known, however great the apparent difference of their structure, and diversified their functions or offices, the deep and unwearied researches of modern naturalists aided by the increased powers of observation placed at their command by the improvement of the microscope, have led to the conclusion that they are all only so many modifications of the cell, while the wall of the cell itself is probably merely consolidated mucus, assuming the form of membrane or fibre, according to laws of which we are at present ignorant. That changes take place of one kind of tissue into another, at different stages of the growth of the plant is unquestionable, as well as that such changes are correspondent with alteration of function; but it is no less

certain that the simple cell contains the rudiments necessary to the formation of the other organs, and especially the spirals, which in their most perfect state appear to be the most complicated of the whole series. "There is no doubt," observes Dr. Lindley, speaking of the different kinds of vegetable tissue, "that all these forms are in reality modifications of one common type, viz., the simple cell, however different they may be from each other in station, function, or appearance. For, in the first place, we find them all developed in bodies that originally consisted of nothing but cellular tissue; a seed, for instance, is an aggregation of cells only; after its vital principle has been excited, and it has begun to grow, woody tissue and vessels are generated in abundance. We must, therefore, either admit that all forms of tissue are developed from the simple cell, and are consequently modifications of it; or we must suppose, what we have no right to assume, that plants have a power of spontaneously generating woody, vascular and other tissues, in the midst of the cellular." Mirbel has lately reduced the first of these suppositions to very nearly a demonstration; in a most admirable memoir on the development of *Marchantia*, he speaks to the following effect: "I at first found nothing but a mass of tissue composed of bladders filled with little green balls. Of these some grew into long, slender tubes, pointed at each end, and unquestionably adhering by one of their ends to the inside of the sac; others from polygons passed to a spherical form in rounding off their angles. As they grew older, other very important changes took place in certain cells of the ordinary structure, which had not previously undergone any alteration; in each of these there appeared three or four rings placed parallel with each other, adhering to the membrane, from which they were distinguished by their opaqueness; these were together analogous to annular ducts. The cells which became tubes did not at first differ from other cells in anything except their form; their sides were uniform, thin, colorless and transparent; but they soon began to thicken, to lose their transparency, and to be marked all round from end to end with two contiguous parallel streaks disposed spirally. They then enlarged and their streaks became slits, which cut the sides of the tubes from end to end into two threads, whose circumvolutions separated into the resemblance of a gun-worm." In these cases there can, I think, be little doubt that the changes witnessed by Mirbel were chiefly owing to the development of a spiral thread in the inside of the tissue.

There is much diversity of opinion as to the mode in which the elementary organs of vegetables are multiplied during the advance of growth, and the rapidity with which that growth proceeds in certain plants is such as to render actual observations as to its source exceedingly difficult; speculation has therefore sometimes taken the lead where

sober inquiry has proved at fault, pointing at results almost too startling even for human imagination to receive as truth; and yet, when we contemplate from day to day the increasing size of many plants in ordinary cultivation—a gourd, for instance, or vegetable marrow, adding to its circumference nearly three inches in the course of the twenty-four hours, and the stem which bears it extending its length between five and six inches during the same period, common sense would pause ere it questioned the truth of records much more marvelous. The rapid growth of the common mushroom has become proverbial, but some other individuals of the class of fungi greatly exceed it in that respect; the *Phallus* or stink-horn sometimes elevates itself six inches from the ground in the space of an hour; the *Bovista gigantea*, or great bull puff-ball, is recorded to have grown in the course of a single night from a mere point to the size of a large gourd, the actual measurement of which is not mentioned, but on a moderate computation of the diameter and number of the cells, it has been estimated to have increased at the rate of 4,000,000,000 of cells in every hour, or upward of 66,000,000 in a minute. It is true that much of this enlargement may have arisen from the distention of the cells individually; but even if this be admitted, the force of development and the vast increase of weight, which can only be accounted for by an appropriation of nutriment so rapid as almost to elude conception, leaves sufficient of the wonderful to impress upon our mind a just idea of the grandeur of that vital energy which inspires and regulates the growth of bodies thus low in the scale of organic nature.

The force with which the minute organs above described are produced and enlarged is no mere supposition, but a fact within the reach of attestation by those who will condescend to observe its operation; the root of a tree descending through a crevice will break and dislocate the hardest rock; cellular tissue, not harder in substance than pith, has elevated a weight with the power of a lever; the latter effect is not unfrequently seen in the growth of fungi under stones and heavy blocks of timber; and the following anecdotes, both, I believe, referring to the same circumstance, and copied from the *Hampshire Advertiser* of July, 1830, are recorded by Professor Burnet as affording a striking instance of this power: "At different times, several of the stones in the pavement in the town of Basingstoke, were observed day by day, to be rising gradually from their beds, until they were some inches above the ordinary level; under one of these, which weighed seven pounds, a large mushroom was found, that measured a foot in circumference." The other case is recorded by Mr. Joseph Jefferson, who says: "A toadstool six or seven inches in diameter, raised a large paving-stone an inch and a half out of its bed; and the mason who had the contract for paving was much enraged at the idea that a weak fungus-

should have lifted so heavy a weight. But his uneasiness was much increased, and even his alarm excited, when, about a month after the injury had been repaired, the adjoining stone was lifted in a similar manner, and two mushrooms, not quite so large, were found beneath it; for it seemed doubtful whether the whole town of Basingstoke might not want repaving during the term of his contract. The stones were nearly of the same size; each being twenty-two inches by twenty-one; the last stone raised in this manner was weighed, and its weight proved to be eighty-three pounds." The hardest of such fungi are, in the growing state, so soft as to yield

to the pressure of the finger, and so brittle as to be shivered to atoms by the slightest blow; yet the organic force with which their tender tissue is developed is capable, acting in millions of points, in the growth and distension of their individually invisible cells, of elevating an inert mass of stone which the strength of an ordinary man would with difficulty raise from its plaster bed.

Such are some of the facts connected with the minute anatomy of plants, the further examination of which, and of the laws of their growth, will furnish the subject of a succeeding lecture.

PLANT MORE TREES.

UNDER the above head the Farmer's Monthly Visitor has a capital article, from which we learn several interesting facts. Gov. HILL, the Editor, says that "Valuable pine timber lots are now grown, whose origin was in the seed less than fifty years ago." The opinion has pretty generally prevailed that pines grown by artificial culture are nearly worthless for timber. We see no reason why this should be so, any more than oak, chestnut, or ash. Mr. H. remarks that "Nature does everything to make up for man's neglect in the planting and growth of trees; nor is she slow in her operations. She has made every acre of waste land in New-Hampshire valuable. The beautiful chestnut timber so much used in the New-England railroads grows spontaneously in all our poorest rocky lands which have been considered too hard for cultivation; the railway chestnut cross-timbers are worth, standing, on the average, sixteen cents apiece—trees of the suitable size making sometimes three and four cuttings. It is said these chestnut trees will grow to the suitable size of posts in the years that these posts rot in the ground. A remarkable feature in the chestnut is that where a main tree is cut, sprouts the same year shoot forth from the roots, growing up a clump of trees, some three to six of which soon grow into sizes to be used for timber."

We have had some little experience in attempting to raise a small forest of chestnut timber from the seed, but with poor success. We have been told that the seeds should never get dry after they ripen in the fall, before they are planted, either in pots or a nursery. Such is the demand for fence posts and railroad ties that the culture of chestnut timber, we are confident, can be made profitable. Every farmer has a wood lot, and as

he thins it out, or cuts it off, he should set the ground full of small chestnuts. Under favorable circumstances they grow rapidly.

It is safe to calculate on the growth of a cord of wood on an acre per annum in Western New-York. This, at \$2, is much better than no income—while the annual burden of leaves that fall to the earth enrich the land.

Shade trees are equally an ornament and luxury during the intense heat of our summer months. Speaking of these the Visitor says: "We boast in the southerly part of the Concord Main-street as beautiful elms as can be shown in any part of the world. There are many charming villas in the country range about Boston; but we must say of these that their cleaned path avenues shaded and covered over by trees high before reaching the limb, or surrounded by the shrubbery which entirely shuts out access of foot or of eye, do not compare with the unadorned beauty of the row of elms opposite on the street to the place of our writing. There is a remarkable similarity in the spread of the isolated elm, which is a native of our intervalle and stands either on that or the first upland of the river bank. The men who set out our stately elms seventy-five and a hundred years ago, Hall, Shute and others, have passed away: at this season, when hundreds of birds come there and build their nests, the elegant gold-robin, the gay bluebird, the chattering wren, and even the shy crow, blackbird, the snarling cat and scolding thrush both sing so beautifully and so alike when undisturbed as to be mistaken each for the other—there is a charm in these venerable trees which bids us remember those who planted them there, and to present them as proof that planting trees is one of those "good deeds" of men which "live after them."

TO CURE THE DISTEMPER IN HORSES.—Give a teaspoonfull, three times a day, of finely powdered gum myrrh, (mixed with the food or otherwise,) and a speedy cure, it is said, will in all cases be effected.

LETTER IX.

PROSPECTS OF THE WOOL MARKET—FUTURE DEMAND AND SUPPLY.

The Imports and Exports of Trans-Atlantic Nations... Means of ascertaining their Comparative Production... Table of the Imports of England... Amount of Wool grown in the United Kingdom, Consumption, Export, Facilities, including Soils and Climate, for its Cheap Production, and Prospect of its Increase or Diminution—Same of France—Same of Spain—Same of Italy—Same of Turkey in Europe—Same of Germany, including Prussia and Austria, with the exception of Hungary—Same of Hungary—Same of Russia—Same of Asia Minor—Same of Persia—Same of Independent Tartary—Same of Afghanistan and Beloochistan—Same of Thibet, Little Bucharra, and the remainder of China—Same of the Cape of Good Hope—Same of Australia and Van Diemen's Land... Conclusions in regard to Comparative Facilities, etc., of above Nations and the United States... The Northern States can compete with the most favored of them—and of course the South can, to much greater advantage... The South might safely embark in Wool-Growing, relying on the European Market alone... Rapid Extension of that Market Past and Future... But the American Wool-Grower is not compelled to seek a Foreign Market... Our Production does not meet the Demand of our own Manufactories... Table of the Imports of Wool into the United States... Table showing whence we Import Wool... Letter from Samuel Lawrence, Esq., showing the increasing call for Manufactories—The Stability of existing ones—and their ability to compete with those of Foreign Countries... Extent of our Consumption of Woolens above the Supply made by our Manufactories... Table of Imports of Woolens... Probable Increase of our Manufactories... Reflections on the Tariff... Rapidly Increasing Consumption of our Population—Amount Consumed per head... Table of Increase of our Population... Future Increase... The Amount of Wool Necessary at various Future Periods.

Dear Sir : Probably there are few men who now dream of any danger to the wool-grower of the United States, in the *home* market, from *trans-Atlantic* competition. But there is another point of view, in which a glance at the facilities of the eastern nations, for the production of this staple, may not be uninteresting. *May we not undersell them with the raw material, in their own markets !* He who carefully and intelligently examines all the facts involved in the solution of this question, will find, in spite of the vague popular impressions which prevail on the subject, that so far at least as those nations are concerned, which *now* produce the greatest amount of the wool which supplies the markets of the Old World, the United States *can*, if satisfied with equal profits, *easily undersell* them.

As an importer of the raw and exporter of the manufactured article, England occupies the first place. In these particulars, she probably exceeds, by fully one-half, *all* the other nations of the Old World. France ranks next, and largely takes precedence of the remaining nations. Holland, though shorn, by disastrous political revolutions, of much of her ancient importance in this class of manufactures, still maintains a trade of some magnitude. Several of the German and Prussian States export particular descriptions of woolens; Italy sends out some light cloths; and Turkey the carpets of that name. A full exhibit of the exports of all the wool-producing nations, would not, of course, lead us to an accurate knowledge of the amount of their production—for there is no one which does not manufacture the raw material to some extent. But with what knowledge we can obtain of their manufactures, the former information would enable us to ascertain, approximately at least, the amount of their production. This is all that is necessary for our present purpose, for we do not now, in reality, so much seek their *actual* as their *comparative* production.

England, as I have before remarked, is the great importer and exporter. Her duties on imported wool are, as has been seen,* exceedingly low, and she makes no discrimination in this particular, in relation to bottoms, or the places of export.† The vastness and variety of her demand give a

* See Letter VIII.

† With the exception, of course, of her own Colonies, from which it is exported free.

greater certainty to the exporter of prompt and favorable sales, in her markets, than in those of any other nation. France possesses the advantage of maritime contiguity, for securing the raw product of the nations bordering on the Mediterranean; and therefore, in some instances, as in the case of Turkey, she receives more of that product, in proportion to her manufacturing consumption, than England. But in one respect the latter has the advantage in securing the trade of the Levant. Between the natural products, and, of consequence, the exports of France and those of the other nations bordering on the Mediterranean, there exists a great similarity. She cannot send her wines to Hungary, nor these nor her silks to Italy, in exchange for wool. Her fruits, and indeed all of her natural products are the same with those of the whole south of Europe. England, the producer, and the great mart of the products of Northern Europe, can offer these in the Mediterranean on better terms than France; and in the manufacture of cotton goods, the main article of dress, and consequently one of the great ones of import throughout the whole Levant, the former possesses a decided superiority. All these natural and artificial circumstances have their weight, sometimes in favor of one, and sometimes the other of these nations, in determining the course of trade—and habit, ancient commercial associations, and even national predilections also throw their weight into the scale. In looking at the subject as a whole, however, all these facts, unless in a very few instances, so far offset each other, that in obtaining a view of the wool trade of England—her imports—we obtain a sufficiently accurate picture or index of the *proportionable* exports of all the nations of the Old World.

Before proceeding to ascertain the actual facilities of the several countries named in the Table, for the purposes of wool-growing, it may be well to briefly glance at that of England herself.

Mr. Luccock* estimated the produce of wool in England and Wales, in 1800, to be 393,236 packs,† or 94,376,640 lbs.; and in 1828, Mr. Hubbard‡ placed it at 463,169 packs, or 111,160,560 lbs. According to a Table formed by order of a Committee of the House of Lords, the same year, the quantity produced on an average of years, in England, is 111,160,560 lbs. According to Mr. Luccock's estimate, (in 1800,) the number of sheep in England and Wales was 26,148,463. It is not thought to have varied much since. The Encyclopædia Americana,|| (published 1835,) on the authority of the Edinburgh Encyclopædia, sets down the then present number of sheep in the United Kingdom as follows: in Scotland 3,500,000; in Ireland probably under 2,000,000; in England and Wales the same number as in the time of Mr. Luccock;—so that the aggregate number would be about 32,000,000. It will thus be seen that England and Wales, with an area much less than that of Virginia,§ have almost 7,000,000 more sheep than the whole number in the United States in 1839!

Large as is the amount of wool produced in the United Kingdom, it does not meet, in the number of pounds, the amount required for woollens consumed in the United Kingdom alone.¶ It is true that England has exported some combing wool, of her own growth, to meet the wants of a certain class of manufactories (of worsted) in France, which could not obtain stock of equal quality in any other quarter; and she has also exported considerable quantities of her own coarse short wools. Of the latter, I am ashamed to say, the United States have been considerable purchasers. The whole export of England, in 1824, amounted to but little over 18,000

* See Luccock on Wool, p. 341 and Table.

† A pack of wool is 240 lbs.

‡ Quoted by Mr. Bischoff—See vol. ii., Appendix.

|| Encyclopædia Americana—art. Sheep Raising.

§ The area of Virginia is 70,000 square miles, that of England and Wales 60,000.

¶ See Bischoff, vol. ii., p. 171.

lbs. From that time it has gradually increased, and in 1838 it reached 5,851,340 lbs.; in 1839, 4,603,799 lbs.; in 1840, 4,810,387 lbs.* Under the last year of the late Tariff, we received from England, of wools not costing to exceed 7 cents per pound, 1,188,800 lbs., and of those exceeding 7 cents, 28,406 lbs.; and from Scotland, of the cheaper class, 21,132 lbs.† This, however, only shows a surplus in *kind*, not in *quantity*. The English short wools have, as has been abundantly shown by the testimony of her most eminent manufacturers,‡ a *harshness* and *want of felting properties* which render them unfit, unmixed with a better stamp of foreign wools, for any but the very lowest description of cloths and stuffs, such as blankets, baizes, army cloths, flushings or bearskins, &c. Nor will they make *prime* articles, even of these low descriptions. England, therefore, after consuming such portions of these wools as she can, in the manufacture of the above-named and similar articles, and by mixing them, in the nature of an *alloy*, with better foreign wools in a low class of fabrics, such as flannels, livery and sergeant's cloth, etc., exports the balance to such nations as are *foolish* enough to purchase it.||

The following Table, compiled from official sources, from Bischoff's "Comprehensive History of the Woollen and Worsted Manufactures, &c.,"§ gives the imports of England every fifth year from 1810 to 1840,

TABLE No. 8.

Countries from which Imported.	1810.	1815.	1820.	1825.	1830.	1835.	1840.
Russia.....	32,149	297,611	75,614	1,992,101	202,871	4,024,740	4,518,563
Norway.....	11,930	40,984		302			
Denmark.....	351,741	424,822	13,527	554,213	179,717	366,444	605,521
Sweden.....	15,424	32,889		3,497	380	1,431	5,961
Prussia.....	123,057	105,073	107,101	131,100	713,246	256,147	24,646
Germany.....	778,835	3,137,438	5,113,442	28,799,661	26,073,882	23,798,186	21,812,099
Holland.....	} 2,873	432,832	186,051	1,059,243	939,123	{ 301,855	46,247
Belgium.....						{ 231,222	134,095
France.....		756,427	230,909	436,678	45,093	104,535	48,830
Portugal.....	3,018,961	1,146,607	95,187	953,793	461,942	683,231	374,915
Spain.....	5,952,407	6,929,579	3,536,229	8,206,427	1,643,515	1,602,752	1,266,905
Gibraltar.....	349,053	12,891	3,851	19,250		476,737	242,734
Italy.....	21,554	97,679	2,815	227,453	9,461	1,051,005	1,668,541
Malta.....	40,040	55,804	5,050	72,131		39,913	2,209
Ionian Isles.....				25,983			121,110
Morea, &c.....						816,625	42,893
Turkey.....		12,513	189,584	513,414		1,281,839	655,964
Syria.....							34,049
Cape of Good Hope.....	29,717	23,363	13,869	27,619	33,407	191,624	751,741
Africa, other parts.....						5,102	337,908
St. Helena.....							4,683
East Indies.....	701		8,056			295,848	2,441,370
New South Wales.....		73,171	99,415	323,995	{ 973,330	{ 4,210,301	{ 6,215,329
Van Diemen's Land.....	167				{ 993,979		{ 2,626,178
Port Phillip.....							785,398
Swan River.....							42,748
South Australia.....							51,590
British America.....	1,217		139	70		14	15,793
British West Indies.....	2,894	53	760		1,725	2,029	3,286
United States of America.....		8,533	578	80,468	7,313	237,306	115,095
Guatemala.....							3,009
Colombia.....							842
Brazil.....	43,014	4,311	4,277	37	1,148	18,760	9,182
Rio de la Plata.....	73,159	41,527	68,759	331,265	19,441	962,900	616,721
Chili.....			14,792	2			586,796
Peru.....				14,313	5,741		
Mexico.....						1,213,740	
Guernsey and Man.....	41,407	6,264	19,015	22,266	7,745	246	11,830
Total Pounds weight.....	10,914,137	13,640,375	9,789,020	43,795,281	32,313,059	42,174,532	46,224,781

* Bischoff, Table 6th. Appendix.

† Report of the Secretary of the Treasury, 1846.

‡ See Bischoff, vol. ii., pp. 107, 153, 154, 163, 173, 175, 176, &c. The testimony here alluded to, or an abstract of it will be given in a subsequent Letter.

§ If these sound like *strong* expressions, I have to say that I shall be prepared to prove them, and shall so do, in a subsequent Letter, from the testimony of the first manufacturers of England before a Committee of the House of Lords. Nor were the facts *disputed* by an interest represented before the same Committee, who had every inducement to do so, if they could be sustained in it.

¶ See Appendix of the above work, vol. ii. Misled by the title on the cover, I have nowhere before given the proper designation to Mr. Bischoff's work. Wherever the authority of this gentleman is given you will understand that it is derived from the work just named. Published London, 1842.

and therefore indicates, as well as the case admits of—home manufactures remaining the same—the rise or decline of wool-growing, in the several nations, for the period indicated.

It will be seen from the above, that Spain, (and we may include the whole Peninsula,) once so famous for her wools, has sunk to a fifth or sixth rate wool-producing country, and that her exports are still constantly declining; that Germany and Prussia have reached their climax, and are on the wane; that Russia, Italy, Australia and the East Indies are the most rapid increasers.

The high prices of land and provisions—nearly double those on the Continent* (far more than double those on many portions of it)—the onerous general taxes and parochial assessments, will not allow wool to be grown in England for its own sake. The sheep must be reared, as a matter of pure necessity, to sustain her present system of convertible husbandry. A sheep fitted for that object, and to make the most meat in the shortest time, is the main desideratum. Wool is but a secondary consideration. None but the coarse, early maturing breeds will, therefore, ever be grown there. Unless some great revolution should take place in her Agriculture, these are not likely to ever materially increase or diminish from their present number. If any effect is produced on this husbandry by the abolition of the Corn-Laws, I think it will be to diminish rather than increase the number of sheep.

France, especially in some of her Southern Provinces, is admirably adapted to Sheep Husbandry. In 1825, the number of sheep in the Kingdom was estimated to exceed 30,000,000, but it is supposed to have materially diminished since that period, by reason of the division of landed property, and other causes.† With a population variously estimated from 163½ to 168 to the square mile,‡ a soil a fair portion of which is well adapted to the growth of bread-stuffs, and the remainder to the vine, fruits, the mulberry (for silk), etc., France finds it better economy to cultivate these, and draw a considerable portion of her supplies of wool from other countries—her fine wools from Germany and Spain, her coarse ones from the regions bordering on the northern shores of the Mediterranean, the Gulf of Venice, and the Black Sea. France exported 84,799 lbs. of wool, costing less than 7 cents a pound, to the United States in 1846.¶ This small amount might have been of her own growth, or derived from her transit trade. By the statistical Tables appended to his description of France, by Malte Brun, it appears that of the 51,777,000 hectares§ which he estimates to comprise the surface, 22,818,000 are in arable land, while the entire extent of meadows and pastures (which are divided about evenly) but little exceeds 7,000,000 hectares.¶¶

Spain, it appears from the Table, now exports less wool to England than Italy or Russia! and is still (as late as 1840) on the decrease. This is not owing to the increase of her manufactures,** or by a diversion of her exports into other channels. The export to France would, undoubtedly, show a similar falling off. That to the United States is but nominal. In 1836 it was but 20,730 lbs.,†† and as this was wool costing less than 7 cents per pound, and came from the Mediterranean side of Spain, it was probably in her ports merely *in transitu*. The Gibraltar trade, given in the Table, I take to be exclusively or mainly a transit one. From the *Balan-*

* See Circular of John Maitland and others, Committee of the Woolen Trade in London—Bischoff, vol. ii., p. 33. † Bischoff, Youatt.

‡ Mitchell assumes the former, and Morse the latter to be the population.

§ Report of Secretary of the Treasury, 1846.

¶ A hectare is 2 acres 1 rood and about 35·4 rods.

¶¶ Malte Brun, Am. ed. vol. iii., p. 1029.

** Spain is not estimated to manufacture more than one-twentieth of the woollens consumed by her. Encyclopædia Amer., art. Spain.

†† Report Secretary Treasury, 1846.

za Mercantil,* published by the Government, it appears that the exports of Spain of all kinds, in 1826, amounted to only £1,587,507. The exports of raw and manufactured silk and gut reached £243,390; lead, £215,360; wines, £189,340; wool, £161,650; fruits, £152,075; brandy, £107,715; barilla, £79,200, etc. This exhibits not only the smallness of the entire export of wool, but the diminished comparative importance of this once great national staple.

The number of sheep in Spain is still placed by many writers as high as 10,000,000 for the migratory flocks, and 8,000,000 for the stationary ones. Even Mr. Youatt has fallen into this, as it strikes me, unquestionable error.† If Spain possesses 18,000,000 of sheep, what does she do with the wool, which should amount to at least 54,000,000 lbs.? Admitting—which probably exceeds the fact—that her export to France and other nations equals that to England, and that she manufactures a quantity equal to twice her whole export, the aggregate amount would be less than 8,000,000 lbs. The author of the article on Sheep Raising in the *Encyclopædia Americana*, places the number of the whole fine-wool sheep in Spain at 4,000,000. This I think high enough, and probably not far from the truth. This is a million less sheep than those of the State of New-York in 1839!

The actual facilities for growing wool in Spain have already been alluded to in my fifth Letter. I should not consider it necessary to bestow farther examination on them, were it not for the fact that owing to various associations connected with the early history of the Merino sheep, and the lead once taken by Spain in the production of fine wool, her facilities have been, popularly, prodigiously overrated, and even the difficulties under which she has labored for this husbandry, magnified into advantages. Her northern mountains are high, broken, cold, and exposed to peculiarly piercing north winds,‡ and the winter on them lasts, as I infer from Mr. Livingston, about six months. He says: ||

“When the severe weather commences on the mountains, the shepherds prepare to depart, which is generally about the end of September and throughout the month of October, to seek more temperate climates and fresher pastures. In April or May, according as the season is late or early, they return to the mountains.”

It *might* be practicable to prepare hay for winter use, in favorable positions, and particularly on the *parameras*, on these mountains, and thus the migratory sheep might become stationary on them. But the Spaniard is too much wedded to ancient customs, too little in love with change of any kind, and, most of all, a change bringing an addition of *labor*, to thus innovate on his own habits or those of his flocks.

The high basins of the Douro and Tagus (embracing the two Castiles and Leon) are too valuable for the cultivation of grain, vineyards, fruits, etc., to be profitably devoted to the pasturage of sheep. The wheat of Spain is among the best in Europe,§ and it is stated in Mr. Jacob's *Tracts on the Corn Trade*, that she frequently does not raise enough for her own consumption.|| For the vine, olive, fig, mulberry, barilla, and various other products of equal profit both for home consumption and for export, she is not excelled probably by any country in Europe. A friend of mine who traveled in Spain in 1845, describes the valleys above alluded to, as almost exclusively devoted to tillage crops. In the Southern Provinces,

* Quoted by McCulloch—*Com. Dic.*, art. *Cádiz*.

† See Youatt on the Sheep, Lond. ed., p. 147 *et supra*. Mr. Livingston in his day estimated the migratory sheep at 5,000,000, the stationary at 8,000,000. See *Essay on Sheep*, pp. 36, 39. Mr. L. was also undoubtedly in error.

‡ Malte Brun.

|| Livingston on Sheep, p. 36.

§ Note by Percival to Am. ed. of Malte Brun; art. *Spain*.

¶ Quoted by McCulloch—*Com. Dic.*; art. *Odessa*.

where rain does not sometimes fall for months in the summer,* the grass becomes entirely dried up, so that flocks, to be made stationary there, would require hay or other prepared food for several of the summer months!

The *Transhumantes* or migratory flocks must still continue, then, to travel from the northern mountains to the warm basins of the Guadiana and the Guadalquivir for their winter quarters, and return to the mountains in the summer, or this branch of the husbandry would undoubtedly become extinct. The effect on the health and condition of the sheep, and the important item which it would form on the debit side of the account in Sheep Husbandry, to thus drive flocks a six weeks' journey twice a year, (consuming nearly a *quarter of the year* on the road,) can be estimated by any one acquainted with such matters.† The losses and expenses thus incurred would absorb all the profits of the husbandry, were it not for the extraordinary privileges conferred on the flockmasters (mainly consisting of the King, nobles and clergy) by the absurd and tyrannical regulations of the *Consejo de la Mesta*.‡ The abolition of the "Council of the Royal Troop," there cannot be a reasonable doubt, would be immediately followed by the downfall of the migratory Sheep Husbandry in Spain. That the day has gone by when this unfortunate and distracted country can ever again enjoy the blessings of permanent peace and settled institutions, under which this or any other branch of husbandry can increase or steadily flourish, until she reaches a point of political civilization entirely incompatible with the continuance of a relic of tyranny and barbarism so monstrous as the *Mesta*, I consider equally certain. I see, therefore, no possible, or at least probable contingency under which the migratory Sheep Husbandry of Spain is likely to be extended, or even to permanently maintain its present footing. Nor is there any probability of her again rising into importance as a wool-producing country, from her stationary flocks.

Italy, though too accessible to the dry, hot wind of Africa, (the *Solano*,) to exhibit the uniformity of deep-green verdure seen north of the Alps, is nevertheless—much of it—a country of fine pasturage. The great plain between the Alps and Appenines, the basin of the Po—including Lombardy, Sardinia, Parma, Modena, etc.—is one of the most productive in Europe, and its extraordinary facilities for irrigation allow five or six crops of hay to be mown in a single season. In Tuscany, the orange and lemon begin to make their appearance—the soil is alluvial and rich, and the mountainous districts are finely adapted to pasturage. The States of the Church are also highly fertile, and abound in good herbage; and on the deadly *Campagna di Roma*, and even the Pontine Marshes, flocks and herds find an abundant subsistence in winter, and are driven to the Appenines in summer. The same remarks apply to the northern portions of the Kingdom of Naples. The southern extremity of Italy is exposed to a burning climate, and exhibits the vegetation of Africa.

The whole superficial area of Italy does not exceed 122,000 square miles, and her population is 172 to the square mile. Scarcely raising bread-stuffs enough for her own consumption, taking one year with another,|| there is not the most remote prospect of her ever becoming an important wool-exporting country.

* See Hon. Wm. Jarvis's Letter to me on the subject of Merino Sheep, when I acted as Corr. Sec'y of the N. Y. State Agricultural Society—Transactions, 1841, p. 322.

† Since giving this as the distance from "the middle of Estremadura to the Cantabrian Mountains" (Letter V.), I see it stated in the *Encyclopædia Americana* that "the whole journey from the mountains to the interior of Estremadura is reckoned at about 690 miles." Measurement on the map will show that it does not exceed 4 degrees or 277 miles, but the difference may be made by the circuitousness of the route, or the writer may refer to more eastern portions of the great Appenine Chain. I find it stated by several writers that each journey consumes six weeks.

‡ For a description of this odious tribunal see Livingston on Sheep, p. 33.

|| See McCulloch's Com. Dic.; art. *Odessa*.

Turkey both in Europe and Asia, it would appear from Table 8, is but a trifling exporter of wool. It should be remarked, however, that the wools of the Western Provinces, and of Greece, are generally exported from Trieste to France.* Under the late American Tariff, ("Tariff of 1842,") the export to the United States was becoming an important one—much greater than that to England. In 1846, it amounted, of wools costing less than 7 cents a pound, to 5,744,328 lbs.† European Turkey has a colder and less uniform climate than Italy, but still it is a fine one,‡ and being a broken, mountainous country, well adapted to pasturage, and but sparsely populated, (55 to the square mile,) it is wonderful that so little attention has been paid to the culture of wool. But the proud and indolent Turk spurns all rural labor, or all interest in it, leaving it to his vassals—and these, destitute of any security to person or property, taxed, oppressed, liable to be compelled to make forced sales to bey or ayan—or, what is worse, their property seized outright—have little inducement to accumulate a species of property so easily pounced upon.||

Germany (including Prussia and Austria) is now the great producer of fine wools, supplying not only her own manufactories—which are estimated to consume half the whole product—but exporting the large surplus indicated in the Table. Nor is this all; for to France, the Netherlands, Switzerland, &c., she is supposed to export half as much as to England.§ The whole region thus included—leaving out the Austrian States in Italy, which have already been considered—comprises a territory of 468,000 square miles, and a population of 58,800,000, or 130½ to the square mile. The country on the north is level, vast plains extending from the declivities of the mountains which occupy the center of Germany, to the North Sea and the Baltic. The center is mountainous, and its plains are very elevated. The extreme South is covered with mountains. From the Little Carpathian or Jablunka Mountains, and from the eastern termination of the Styrian and Julian Alps, stretch away the vast Hungarian and Transylvanian plains to the confines of Turkey.

The great northern plain of Germany is low, sandy, flat, often consisting of naked silicious sands or those covered with lichens, interspersed with frequent marshes, and terminating in many places on the Baltic in vast morasses, or land redeemed from the sea by dikes. As a whole, the land, particularly in the maritime Provinces, is of an inferior quality, but some portions of it, as for example in Silesia and Saxony, is of a quality ranging from medium to good. The soil of Central and Southern Germany (including Austria) must, of course, exhibit many varieties. In general, however, it may be set down as productive in the valleys, and ordinary or poor on the high lands. The lower plains of Wirtemberg, Baden, the South of Bavaria, etc., are exceedingly fertile. The plains of Hungary on the south-east not uncommonly exhibit soils of remarkable richness, but they alternate with inferior ones, and with vast and unhealthy morasses. Taken together, the region which I have included under the designation of Germany, though not a sterile country, is not favored with soils naturally as productive as those of Italy or Spain; nor would it at all compare with that portion of the United States west of the Apalachians.

The climate of Germany is thus summed up by Malte Brun : ¶

* Southey, quoted by Bischoff, vol. ii. p. 356.

† Report of the Secretary of the Treasury, 1846.

‡ For a picture of this as well as the other natural features of Turkey, both in Europe and Asia, Greece, and the Ionian Isles—as delicately accurate, as soft and rich as one of the scenes of Claude—see Childs Harold, Canto II., the opening of the Giaour, the Bride of Abydos, etc. Though this may be deemed a singular, it is the very best reference, which my reading enables me to make.

§ See Urquhart on Turkey and its Resources, p. 139.

¶ Encyclopædia Americana; art. *Wool*.

¶ Am. ed., vol. ii., p. 594.

"The climate of Germany is greatly modified by the elevation and declivities of the country; but independently of that cause, it does not admit, from its extent in latitude, of any vague or general definition. It may be divided, however, into three great zones, and these, too, are susceptible of other subdivisions. The first is that of the northern plains, of which the temperature is not so cold as it is humid and variable; they are exposed to every wind, while fogs and tempests are conveyed to this region from two seas. The north-west plain is subject, from its vicinity to the North Sea, to frequent rains and desolating hurricanes. The influence of the Baltic on the north-east plain is less powerful; the climate, though colder, is not so humid and variable.

The second general zone comprehends all the central part of Germany. . . . The mountains in that extensive region form a barrier against the effects of the maritime climate. The sky is not obscured by mists, and the regular order of the seasons is not interrupted by winds and tempests; but the elevation of the soil renders the climate colder than in other countries in the same latitude nearer the level of the sea. . . . The third general zone is that of the Alps. The lofty heights and rapid declivities connect very different climates; thus the culture of the vine ceases in Bavaria and Upper Austria, and appears anew with fresh vigor in the neighborhood of Vienna. The eternal glaciers of Tyrol and Salzburg are contiguous to the valleys of Styria and Carniola, covered with fields of maize or vineyards, and almost border on the olives of Trieste and the lemon-trees of Riva."

Contiguous mountains render the north of Hungary extremely cold. Farther south, the climate rapidly becomes warmer, and on the lower plains in the extreme south the heat is intense and the climate insalubrious.

The *bauer* or farmer in those States of Germany where the feudal tenures have been abolished, and the land is held in fee simple, owns four or five English acres of land. These men, says Mr. Jacob,

"although placed above the pressure of want, or possessing the bare necessities of life, have very little beyond them. Such as are industrious and frugal, by cultivating their small portion of ground, may raise a sufficient quantity of potatoes for their own consumption, corn for their bread, and provisions for two draught oxen. They all raise a small quantity of flax, and some few *contrive to keep five or six sheep*. It is often no easy matter for those to find occupation, who are desirous of other employment in addition to the cultivation of their own land, for no agricultural labor can be carried on during the long and severe winters. . . . It is rare indeed that they can afford to have meat of any kind, and those only who are more prosperous than their neighbors can keep a cow to provide themselves with milk."

The wool raised by these owners of five or six sheep, is annually bought up by Jews and other traveling agents, who go from house to house to collect it.

The following extracts from William Howitt's sprightly and interesting "Rural and Domestic Life in Germany" will show under what circumstances a great portion of its wool is grown:

"Here you look in vain for anything like the green fields and hedge-rows of England. . . . It is all one fenceless and plowed field. Long rows of trees on each side of the road are all that divide them from the fields. . . . The keeping up of the cattle presents you a new feature of rural life. As the quantity of land left for grass is very small, the grass is proportionably economized. The little patches of grass between woods and in the open parts of the woods, the little strips along the river-banks and even in gardens and shrubberies, are carefully preserved for this purpose. You see women in these places cutting grass with a small hook or smooth-edged sickle, and carrying it away on their heads in baskets for their cows. You see the grass on the lawns of good houses, on grass-plats, and in shrubberies, very long and wild; and when you ask why it is not kept closer mown, the reply is that it is given to the milk-woman, often for a consideration, who cuts it as she wants it. You see other women picking the long grass out of the forests, or under the bushes on the hill-sides where the slopes have been mown, for the same purpose. . . . The children may be seen standing in the stream in the villages carefully washing weeds before they are given to the cattle. . . . Nettles, chervil, cow-parsnip, which in England are left to seed and rot, are all here cut for the imprisoned cow. You go down to the river-side to fish, and a peasant is soon with you, chattering and gesticulating, pointing to your feet and to the grass. It is to let you know that you are not to angle there, because it treads down the grass; and accordingly, in Germany, with rivers full of fish, you seldom see an angler; if you, he is pretty sure to be an Englishman. . . . Not a sheep, a horse, or a cow is to be seen. . . . The mountain tops are covered with wood. The slopes are covered with vineyards. You ask where the cattle are? You are answered, in the stalls. Where are the sheep? Under the care of shepherds, somewhere—Heaven knows where! you never come across them. It is only on the great

plains of the North that you afterward find large flocks and herds, under the care of keepers, kept close together; for as they have no fences, they are under the momentary peril of making ravages on their neighbor's crops."

Between Leipsic and Berlin, on the plains of Saxony, Mr. Howitt first saw flocks of sheep in the field, and he says:

"One thing which surprises an Englishman is to see what wretched creatures are the sheep which produce the famous Saxony wool. . . . In fact, it is a prevailing idea that the leaner the sheep the finer the wool. It is the wool to which all the attention of the grower is devoted, and therefore, generally speaking, a more miserable assemblage of animals than a flock of German sheep is not to be seen. . . . On the plains they wander under the care of a shepherd, and for the most part on fallows and stubbles, to pick up odds and ends, rather than to enjoy a regular pasture. You may see them penned on a blazing fallow, where not a trace of vegetable matter is to be seen, for the greater part of a summer day, which in this climate is pretty much like being roasted alive. . . . For what purpose they are here, except to starve and melt them into leanness, I never could discover. . . . The sheep, besides being lean, are generally dreadfully lame with that pestilent complaint the foot-rot, and their keepers, apparently, trouble themselves very little about it."

Mr. Howitt states that it is necessary to economize the land so closely, to sustain the population, in some parts of Germany, that the peasants actually convey earth up steep hill-sides in baskets, and cover the rocks with it, to thus add to the tillable soil!

In reviewing the preceding facts, you are struck with no one which would indicate particular natural advantages for sheep rearing in the States of Germany, Prussia, and—with an exception presently to be named—Austria. The climate of the North is humid, fickle and tempestuous; that of the middle cold with long winters. Neither possess any advantages over our own *Northern States*—and in some respects are decidedly inferior to them. This was the opinion of that eminent sheep-breeder and excellent man, Henry D. Grove, of this State, who was a native of Prussian Saxony, and who certainly would never be suspected by any one who knew him personally, of any want of partiality for anything pertaining to his *Fatherland*! In his letter to Benton and Barry on wool-growing, &c., he says:

"Ten years' experience has fully satisfied me on this point. In some respects, we possess natural advantages over Germany."

In what particulars he awarded the preference to the United States, his letters and oral declarations to me, leave no uncertainty. It was both in *soil* and *climate*, and in instituting the comparison, he had his eye not on the most favored sections of our country, but on the hills of Rensselaer County in this State, where he resided.

If in *natural* advantages we surpass Germany, how much more we do in *artificial* ones, may be estimated from the preceding extracts from Messrs. Jacob and Howitt. To these general remarks portions of Hungary form an exception. In these, the climate is fine, the soil rich, and, the feudal tenures remaining unabolished, the land is yet held in those large estates so favorable to Sheep Husbandry. Prince Esterhazy, the former Austrian Ambassador to England, says Mr. Paget,* owns an estate of something more than 7,000 square miles, including 130 villages, 40 towns, and 34 castles. His sheep are said to amount to 3,000,000.† Other nobles own flocks of from ten to thirty thousand. The demi-savage Magyar serf, whose labor costs nothing, whose principal garment is a sheep-skin, and whose miserable and scanty food is more than half stolen,‡ makes a most *economical* shepherd! Hungary lacks facilities for internal communication, and her convenience to the Mediterranean markets—excepting Turkey—so as

* Paget's Hungary and Transylvania, vol. i. pp. 46.

† Youatt.

‡ See Paget's Hungary, &c., p. 13 to 19.

to first throw her agricultural products into ports where the demand is good, is decidedly inferior to that of Italy, France and Spain. The Danube is the only natural outlet to her commerce—which, thanks to a liberality of policy on the part of Turkey,* contrasting most favorably with that of several *enlightened* nations† under similar circumstances, she enjoys without limitation. To reach Trieste, a long land carriage is indispensable. Her exports too, are embarrassed by the imposts and narrow restrictions of the Imperial Government. She cannot, therefore, export cheap heavy articles, such as provisions, to so great advantage as the Levantine nations: but every circumstance points to her as a country which should be one of the first on the Eastern Continent, for the production of wine, silk, wool, &c.

Separated from Hungary and Transylvania only by the Carpathian Mountains and Turkish Moldavia, lie the fertile provinces of South-eastern Russia, the basins of the Dniester, the Dnieper, and the Don. From the Carpathians to the Caspian, across the entire extent of the plains of ancient Scythia, not an elevation which could be properly dignified with the appellation of a mountain, breaks the immense expanse! The lower valley of the Dniester or Borysthenes, formerly known as the Ukraine, has been celebrated for centuries for its pasturage—for its horses‡ and cattle: and recently flocks of Merino sheep have been introduced there and successfully crossed with the native variety. In 1839, Mr. Slade states that many of the colonists on the Steppe and in Bessarabia had 20,000 sheep. Merinos were introduced into Crimea or Taurida, by M. Rouvier, a French adventurer, in about 1802.¶ In this favored peninsula, which the learned Pallas describes as little less than an earthly Paradise, they have multiplied exceedingly, and extended to Cherson, Ekatherinoslav, Bessarabia and other provincial Governments.§ The export of wool from Odessa in 1829 was 3,402 lbs.; in 1830, 21,361 lbs.; in 1831, 35,058 lbs.; in 1832, 41,558 lbs.; in 1833, 66,457 lbs.; in 1834, 66,901 lbs.¶

In one respect Southern Russia has the advantage over Hungary. It is more sparsely populated, and land is perhaps in still lower estimation. As in the latter, the land, much of it, is fertile and well adapted to pasturage, and the price of labor is next to nothing. But for causes adverted to in the opening part of my eighth Letter, there is a wide disparity in the climates of the two countries, if we leave Crimea out of view. That of Russia, affected by the north and north-east winds—which the Carpathians exclude from Hungary—has a winter which for length and intensity is entirely unequalled in the latter, excepting in its northern mountainous regions. Sheep must be housed, and fed for some months on dry food, in Southern Russia. Taking into view the broad, level *steppes*** and their luxuriant natural verdure—taking into view the climate, warm in summer, cold and exposed to winds of great severity in winter, it strikes me that there must be no inconsiderable resemblance between this portion of Russia and our own north-western prairies in corresponding latitudes (45° to 46°). But when the cost of land and labor is taken into consideration, wool can be produced cheaper, in my judgment, in South-western Russia than in Spain, France, Germany, Italy or any other portion of Europe, excepting Hungary. Were

* This power is remarkable for its liberality in all its regulations which affect the trade and commerce of other nations.

† *e. g.*, the policy of England in relation to the navigation of the St. Lawrence.

‡ This wild region and its horses have been rendered classic by Mazeppa. Who, that ever read, has forgotten the description of the horse on which the Hetman performed his fiery and perilous ride!

¶ For an interesting account of the adventures of this fortunate French Jason, see Slade's "*Travels in Germany and Russia*," published London, 1840.

§ See Slade's *Travels*; also McCulloch's *Com. Dic.—art. Odessa*.

¶ McCulloch's *Com. Dic.—art. Odessa*.

** This Russian word has a similar signification to *prairie, pampas, llanos, &c.*

European Turkey differently populated, and under different institutions, it might constitute another exception.

Central and Northern Russia, like the States north of Germany, are north of the wool zone. Their winters are too long and severe to allow them to compete with regions lying farther south, in wool-growing.

Asia Minor, or Turkey in Asia, and Persia have been alluded to—the former, much of it, a fine country with a most delightful climate, but its natural advantages all neutralized by its political systems and the character of its population—the latter, except in occasional favored positions, such as the valleys of Shiraz and Ispahan, a land of mountain and desert, of intense heat and intense cold.

Independent Tartary, lying immediately north of it, is less exposed to the hot winds of Arabia, but more so to the freezing ones of Siberia. Its vast dry plains are usually deserts, excepting on the borders of its exceedingly rare streams. Great Bucharia, however, in the south-east, on the head waters of the Amoo (Oxus)—from the Capital of which Timour (Tamerlane) issued on his desolating path of conquest—is a country of great fertility. Its natural beauties constitute a favorite theme with the poets and geographers of Persia and Arabia. Since the opening of the navigation of the Indus, it has annually sent some wool to Bombay, which constitutes a part of that which is shipped thence to England, and is known in Table 8 as East Indian wool.

Afghanistan and Beloochistan, protected on the north from the Siberian winds by the lofty Hindoo Koosh mountains, and less exposed on the south to those of Arabia, exhibits a milder and less variable climate than that of the conterminous regions of Persia. Among the Highlands of the north, and those skirting the Indus on the east, there is much good pasturage. Sir Alexander Barnes states that four-fifths of the whole surface of Cabul, a Province of the former, is excellent pasture land. The wool of the broad-tailed sheep of these countries also finds its way, by the Indus, to Bombay, and is classed as East India wool in the Table.

From the high, cold, mountain regions of Thibet, Little Bucharia, &c., some wools are exported, through the same channels, which come under the same classification. These countries also export shawl wool.* Most of China north of the great Desert of Cobi is a cold, mountainous country. The southern portion, or China Proper, is too densely populated and closely cultivated to be devoted to pasturage.

The wool trade which followed the opening of the Indus (the raw material being supplied by Afghanistan, Great Bucharia, Thibet and some of the Hindostanese Provinces) might doubtless be swelled into one of great importance, particularly by introducing finer breeds of sheep; but we can scarcely expect this, from what we know of the habits, agricultural and commercial, of the population. Among constant political changes wrought by the only Asiatic argument—the sword—the personal habits and occupations of the Asiatic remain ever the same, and are, perhaps, the best type of persistency to be found in anything short of immobile matter. Indeed, the stony features of the Sphinx have changed scarcely less through revolving generations, than have the ethnic ones of this great family of the human race!

Let us now pass to those regions of the Old World, south of the Equator, included in the wool-growing zone.

The southern extremity of Africa—the Cape of Good Hope—is included

* The table-land of Thibet is elevated 15,000 feet above the level of the sea. Mr. Trail remarks that every animal here, including Carnivora, produce that down under their hair which is known as *shawl wool*—though that manufactured comes mainly from a species of goat.

in the wool-growing zone. The following description of it is by Rev. Robert Moffat, for twenty-three years a resident of it as the agent of the London Missionary Society :*

"The Colony extends from west to east about six hundred miles, its average breadth being about two hundred. . . . Between the coast and the vast chain of mountains, beyond which lie the Karoo, the country is well watered, fertile and temperate. The other portions of the Colony, with few exceptions, and without a change in the seasons, appear to be doomed to perpetual sterility and drouth. The Karoo country, which is in the background of the Colony, is, as Lichsteinstein correctly describes it, a parched and arid plain, stretching out to such an extent that the vast hills by which it is terminated, or rather which divide it from other plains, are lost in the distance. The beds of numberless little rivers, (in which water is rarely to be found) cross, like veins, in a thousand directions, this enormous space. The course of them might, in some places, be clearly distinguished by the dark green of the mimosas spreading along their banks. Excepting these, as far as the eye can reach, no tree or shrub is visible. . . . But even on these hills and sunburnt plains thousands of sheep pasture on a thin sprinkling of verdure and esculents. . . . The entire country, extending in some places hundreds of miles on each side of the Orange River, and from where it empties itself in the Atlantic, to beyond the 24th degree of east longitude, appears to have the curse of Gilboa resting upon it. It is rare that rains to any extent or quantity fall in those regions. Extreme drouth continues for years together. The fountains are exceedingly few, precarious, and latterly many of these have been dried up altogether."

According to Barrow, nearly seven-tenths of the Colony are destitute of vegetation during a greater part of the year. Sand drives before the winds, exercising an unfavorable influence on sheep and wool. Lions, tigers, wolves, hyenas, jackals, wild dogs, etc., are numerous on the very skirts of the settlements, making much vigilance necessary for the protection of the sheep; and they must be nightly driven into the settlements to be folded. But the natives have proved a vastly more destructive enemy than these.† The sheep introduced by the English colonists will probably eventually considerably increase beyond their present number in a country of so great extent, but we are scarcely authorized to believe that the Cape will ever take a high rank among the wool-producing countries of the world.

That great island, or continent, known as New South Wales, or Australia, has a superficial area equaling that of the United States. But a limited portion of it, however, is included in the wool zone. All of Van Diemen's Land, or Tasmania, is in that zone. The export of wool from these countries, as will be seen from the Table,‡ reached nearly ten million pounds in 1840—nearly half that of Germany, including Austria and Prussia, and almost *eight times* that of Spain! Here, as at the Cape of Good Hope, there are no woollen manufactories, and being Colonies of England, their export to that country exhibits their *whole* production.

The soil, products, &c. of Australia are thus spoken of by Mr. McCulloch : ||

"The fertility of the soil in most parts of New-Holland that have been explored with any care, is very far indeed from corresponding with the glowing descriptions of some of its casual visitors, whose imaginations seem to have been dazzled by the magnificence of its botanical productions and the clearness and beauty of the climate. The truth is that the bad land bears a much greater proportion to the good in New-Holland than in almost any other country with which we are acquainted. . . . Of course it is not to be supposed but that in a country of such vast extent there must be some fertile districts; but along the east coast, with which we are best acquainted, these seem to be much more confined than might have been expected; and the little experience we have had on the west side, at Swan River and other places, does not seem to lead to any more favorable conclusions."

After stating that if the Government price of lands "is not a great deal

* Missionary Labors and Scenes in Southern Africa, pp. 23—24.

† See Letter V., and Note.

‡ Including Port Philip, Swan River, and South Australia, the exports of which are carried out separately in Table 8.

|| McCulloch's Com. Dic.—Art. Sydney.

above the mark in New-Holland, it must be a great deal below it in Upper Canada," Professor McCulloch continues :

"If the Americans exacted the same price for their public lands that we do, something might be found in favor of extending the principle to Canada. They, however, do nothing of the sort, but sell much better land at a decidedly lower rate. . . . If slaves could be imported into a Colony of this sort, there might be some chance of its succeeding. But while land of the very best quality may be had in the Valley of the Mississippi for about a dollar an acre or less, we think better of the common sense of our countrymen than to suppose that any one able to carry himself across the Atlantic will resort to Australia."

Of the climate he says :

"The climate of such parts of New South Wales as have been explored by the English is particularly mild and salubrious. . . . On the other hand, however, it has the serious defect of being too dry. It seems to be subject to the periodical recurrence of severe drouths. These prevail sometimes for 2, 3, or even 4 years together. The last 'great drouth' began in 1826, and did not terminate until 1829. Very little rain fell during the whole of this lengthened period, and for more than six months there was not a single shower. In consequence, the whole surface of the ground was so parched and withered that all minor vegetation ceased; and even culinary vegetables were raised with much difficulty. There was also a pretty severe drouth in 1835. This is the great drawback of the Colony; and were it more populous the drouths would expose it to still more serious difficulties."

Another drouth occurred in 1841, and Mr. Hood thus describes its effects on the sheep :*

"It will be scarcely believed in England that the estimated number of sheep which have died within the last twelve months in the Colony from catarrh and drouth is 70,000!! that colonists are compelled in order to save the dam from starvation, to cut the throat of her lamb; that no means are adopted for securing a stock of lambs for next year; or that a stockholder would offer 8,000 sheep to any one that would remove them from his runs, and finding that no one could be prevailed upon to taint his own flocks by accepting so dangerous a present, had recourse to consuming them by fire, and had actually killed and burnt 2,000." . . .

Of the country Mr. Hood remarks :

"The first object on the arrival of every settler should be to procure a good country for his flocks, and this, I have elsewhere said, is his grand difficulty. Let him be wary on this point. Almost every desirable or habitable spot in the old countries, as the early settled districts are called, is already occupied."

Some diseases seem to be peculiar to the country, or, rather, peculiarly inveterate in it. Mr. Youatt says :†

"The sheep frequently suffer from the wild and poachy nature of a considerable portion of the pasture. The foot-rot seems to assume a character of its own. . . . If neglected, it speedily becomes inveterate and preys upon and destroys the animal. The losses occasioned by it in the early existence of the Colony were frightful."

The astringency of the water and other causes have produced severe epidemics. In some years, some of the flockmasters have lost half of their sheep.‡ The scab is a prevailing disease, and Doct. Lang says :||

"When a convict shepherd has a pique against his master, or even against his overseer, it is often in his power to subject the whole of his master's flock to this obnoxious disease, merely by driving his own flock a few miles from their usual pasture, and bringing them into contact with a diseased flock. The chief source of the wealth and prosperity of the Colony is thus, in a great measure, at the mercy of the most worthless of men."

The cost of both land and labor is comparatively (*id est*, compared with the unoccupied lands of the United States) high. The Government minimum is 5s. (\$1 15) per acre, but very little if any good land is sold at that price. Mr. Hood states that the portion of Capt. McArthur's immense estate which was obtained by purchase, cost, on the average, 7s. 6d. (\$1 72½) per acre. Shepherds receive from £15 to £20 (\$69 to \$92) with

* Quoted by Spooner in "History, Diseases, &c., of the Sheep." London, 1844, p. 67.

† Youatt on Sheep, p. 189.

‡ See Spooner, pp. 417-421.

|| Lang—Historical and Statistical Account, vol. i., p. 351.

a house and rations, per annum; overseers of a superior description £50 to £60 (\$230 to \$276),* also with a house and rations.†

The sheep are exposed to the depredations of various animals, but the wild dog is their most dangerous enemy, with the exception of the *run-away convict*. The sheep are therefore folded nightly, guarded by a watchman with his dogs, and with a fire to scare away the wild beasts.‡ One shepherd usually takes care of about 300 sheep, and "in the more sterile parts of the Colony, where three acres of the uncultivated ground are scarcely sufficient for the support of one sheep, the labor is very severe."||

Mr. Samuel Lawrence recently wrote me :

"I saw a gentleman from England a few months since who has an admirable flock in New South Wales, of twenty-five thousand sheep, and he assured me he had not received a penny of income from them since 1838."

Van Diemen's Land (containing 28,000 square miles) is claimed by Mr Youatt§ to be superior in several respects to Australia as a wool-growing country. Table 8 does not, however, show that its exports increase any more rapidly.

Both of these Islands, as colonies of Great Britain, send their wool to the latter duty free, and they save 1 cent per pound on wool costing less than 24 cents, and 2 cents on that exceeding that value. But this by no means offsets against the additional cost of freight, over that exported from the United States, Hungary, or the south of Russia. While it is only 3,375 miles from New-York to London, it is not less than 13,000 miles from Sydney or Hobart's Town to the latter place. Professor McCulloch states (art. *Sydney*) that the expense of conveying a passenger to Sydney is about three times that of conveying one to Quebec. I see no reason why a corresponding difference should not exist in the freights; and in that case, freights from the United States would be two-thirds less than from Australia.

I pretend, Sir, to no power of vaticination on this subject, but the conclusions which I draw from a review of all the foregoing facts are as follows :

1. That wool-growing is never likely to permanently and importantly¶ increase in any of the countries of Europe, unless it be in Hungary, Turkey, and the south of Russia.

2. That it is more likely to decrease than increase in Great Britain, France, Portugal and Italy.

3. That such a decrease is next to certain in Spain and Germany, (including Prussia and Austria in the latter,) excepting Hungary and Transylvania; that the decrease will be much more considerable in Germany; that its rapidity and extent will be proportioned to the rapidity and extent with which the market is supplied from countries which can grow wool cheaper, such as North and South America, Hungary, Southern Russia, and Australia.

4. That wool-growing will undoubtedly largely increase in Hungary and Southern Russia—and that it *ought to* in European and Asiatic Turkey, but will not, extensively, until the character of the people and their political institutions are changed.

5. That it will also increase at the Cape of Good Hope, Australia and Van Diemen's Land; but that its economical extension in either of these countries is limited, especially if America becomes a competitor.

* Calling the English shilling 23 cents, according to Report of Director of U. S. Mint, 1827.

† Report of a Committee, &c., quoted by Mr. McCulloch—Com. Dic.; art. *Sydney*.

‡ Cunningham's Two Years in New South Wales, vol. i., p. 234.

§ Youatt on the Sheep, p. 188.

¶ *Quem vide*, p. 190.

¶ I say "importantly," because Sweden, Norway, Denmark, &c., in that spirit of rendering themselves independent of foreign supplies, which characterizes all nations, may, and probably will extend their wool-culture: but it will be too unprofitable a struggle against Nature, to be carried to a very great extent.

6. That no part of the Eastern Continent or its islands, all things considered, possess equal advantages for wool-growing with some parts of the United States. 1. The climate of many portions of the latter (in the South) is not excelled by that of the most favored situations in Hungary or Australia; and in this respect it is decidedly superior to the south of Russia. 2. The soils of vast sections of the United States, with the above climate, are more *uniformly* fertile and adapted to pasturage than those of either Hungary or Southern Russia—and, as a whole, are entirely superior to those of Australia. 3. The regions alluded to in the United States, are better watered with running streams than either of the other named countries—have not the vast and unhealthy morasses of Hungary—and are not subject to the destructive drouths of Australia. 4. The land is cheaper in the United States than in Australia, and (my impression is) than in Hungary or Southern Russia; and, in the Southern States, labor costs no more than in the two latter, and far less than in the former. 5. In accessibility and nearness even to the great *European* wool market, the United States stand on equal terms, at least, with Hungary and Southern Russia, and the distance from Sydney (in Australia) to London is nearly *four* times the distance from New-York to London. 6. In *no* respect do either of these countries, the most favored in the Old World, excel, in my judgment, for the purposes of Sheep Husbandry, large portions of the United States; and I believe those portions of the United States can sell wool in the English market at a better profit on all the capital invested than either of the above countries, with the possible exception of the most favored portions of Hungary.

Our surplus wools can, therefore, at any time, be exported to England at a *reasonable* profit. This is true, even of wools grown in the Northern States. In 1845, the United States exported wool, (mainly to England,) to the value of \$22,153; and in 1846, to the value of \$203,996. This was a commercial experiment, and although it is not understood to have resulted in any profit to the exporters, the wool sold at an advance on the American prices current—and would have sold so as to have realized a handsome profit to the exporters, had it been properly sorted and otherwise prepared to meet the requisitions of the English market. Statements of this kind have been published by one of the most prominent of the exporters. It would seem, from Mr. Lawrence's statement, already quoted, that the prices of Australian wools have not yielded a profit over all expenses, during the same years. The quality and style of our wool have been praised by the English press, and are understood to have given high satisfaction to the English manufacturers. On the whole, then, we may regard this experiment as a successful one. The American prices current of those years were about 32 cents per pound. We have seen that the actual cost of wool (including all expenses, and 7 per cent. on price of land and sheep), in the Northern States may be set down at about 27 cents per pound.* These facts show that a *remunerating* price can be obtained for even *Northern* wool in England—if a profit on investment considerably exceeding the highest legal rate of interest (7 per centum) is to be considered "*remunerating*." And if this is true of the Northern wools of the United States, how much more so would it be of those of the South, the first cost of which has been estimated at less than *one-third* that of the former!†

I see not, therefore, a shadow of a reason why our Southern States might not embark, at once, with perfect safety, in an extensive production of wool, *if they had only the foreign market to look to*. I hesitate not to

* See Letter V.
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† *Ib.*

assert that they could drive all the European nations from the market, with the two or three exceptions heretofore specified; and with these, as well as the most favored Austro-Oriental regions, they could maintain a successful competition. The same remark is true of the Austro-Occidental regions of our own continent. And it is difficult to foresee the ultimate extent of this trans-Atlantic demand for wool. Vast portions of the Old World, in those zones where wool must eventually become the principal article of clothing, are but just stepping within the verge of civilization—just laying aside the skins and peltry of the pastoral nomad and the savage hunter, for garments of cloth. In 1771, England imported 1,829,772 lbs. of wool; in 1840, the import was 52,959,221 lbs.! In 1771, the export of woollens was £4,960,240. In 1840, the export of woollens was, £5,652,917, and of woollen and worsted yarn £3,796,644. Making all necessary allowance for the difference in prices, the increase in the export bears no comparison whatever to that in the import. What seems to be the unavoidable conclusion? It is that the *consumption* of a population of 27,000,000 (the population of Great Britain and Ireland) has thus enormously swelled within the period of *sixty-nine* years! This too in a country with a mild climate—which at the beginning of that period (1771) was as far advanced in social and political civilization, and the mass of whose people were as well clothed and better fed, than those of any nation on the Eastern Continent! It is not necessary to follow up this idea. Progress is an inseparable condition of humanity,* and civilization is its fruit. With the latter, new wants—a demand for greater comforts and luxuries—steadily keep pace; and with these again keeps pace the increase of population.† Both the latter causes conspire to swell the demand for cloths; and both causes are at work in this Nineteenth Century, in a velocity of ratio which would fill a Malthus and Ricardo with consternation—if, indeed, it did not convince them of the fallacy of their gloomy theories. I dare to predict that the time will come when the present Russian Empire will consume a greater amount of woollens than the whole Eastern Continent now does! This may not come to pass in a day or a century—but unless retarded by unnatural, not to say *unusual* causes, our posterity in the third or fourth remove will be likely to witness it! Away, then, with those fallacious fears of over-production of cotton, bread-stuffs, etc.—the opposite extreme of Malthusianism—which have disturbed the repose of producers who are not content to let the great natural currents of demand and supply regulate each other; or rather, who are not content with those fair and just profits which they would receive under such an order of things.‡

But the American wool-grower is not compelled to look to the European market, unless he enormously increases his own production—and continues to increase it with the increase of the population. The Census of 1840 shows that the number of sheep in the United States, in 1839, was nearly 20,000,000. These have been steadily increasing, and probably now greatly exceed that number. Yet these have never supplied the demand of *our*

* This may not be thought to accord with preceding statements in relation to the unchangeability of Asiatic character and customs. Particular families or races of mankind have always advanced slowly, but the course of the world, as a whole, is onward. The circle of civilization widens, and races which come in contact with it, receive it, or are conquered and absorbed by the civilized races.

† When I speak of *luxuries* promoting the increase of population, I do not use the word in its invidious sense. I mean by it those things which, though not, strictly speaking, *necessaries*, tend to promote human comfort.

‡ I mean this remark in no ultra spirit. Governments must be supported and resources raised. Incidental protection may be justly afforded to the products of agricultural or mechanical skill, under certain circumstances. But the fewer of these restrictions that are found necessary, the more rapidly, as a general rule, the wealth and comfort of mankind and nations are advanced.

own manufactories alone. The following Table* will show the value of the imports of wool into the U. S. from 1837 to 1847 :

TABLE No. 9.

	Average im- ports of 1837, 1838 & 1839.	Average im- ports of 1840, 1841 & 1842.	† Import of 1843.	Import of 1844.	Import of 1845.	Import of 1846.
Wool not costing to exceed 7 cts. a lb.....	\$558,458	\$759,646	\$190,352	\$754,441	\$1,553,789	\$1,107,305
Exc'ding 7 cts. a lb.	801,087	1,004,312	54,695	97,019	136,005	26,921
Total.....	\$1,359,545	\$1,763,958	\$245,047	\$851,460	\$1,689,794	\$1,134,226

It may be a matter of interest to know from what countries these wools were imported. The following Table‡ will give this information for the last fiscal year, (1846,) and will also give a general idea of our wool trade.

TABLE No. 10.

WHENCE IMPORTED.	Wools not exceeding 7 cents per pound.		Wools exceeding 7 cents per pound.	
	Quantity.	Value.	Quantity.	Value.
	Pounds.	Dollars.	Pounds.	Pounds.
Russia.....	955,163	60,678		
Hanse Towns.....	6,966	330	13,820	8,433
Holland.....			170	93
Dutch West Indies.....	10,774	556		
Belgium.....	7,177	248	1,407	775
England.....	1,188,800	35,944	28,406	6,668
Scotland.....	21,132	1,382		
Gibraltar.....	207,006	12,339		
Cape of Good Hope.....	83,662	6,810		
British West Indies.....	8,694	537	522	70
British American Colonies.....	168,589	9,543	39,346	4,562
France.....	84,799	5,424	396	40
Spain.....	20,730	1,425		
Italy.....	81,156	4,720		
Trieste (Austria).....	111,981	8,151		
Turkey.....	5,744,328	398,822		
Morocco (Africa).....	72,816	4,554		
Mexico.....	425,148	26,984		
Brazil.....	45,215	3,083		
Argentine Republic.....	4,295,659	327,572	43,831	6,011
Chili.....	1,819,772	130,837		
Peru.....	122,686	8,588		
Asia, generally.....	945,729	58,778	2,397	269
Total.....	16,427,952	1,107,305	130,295	26,921

That the course of trade indicated by the above Table, will, as has been already intimated, be materially affected by the New Tariff, I think there can be but little doubt. That of several of the places enumerated, too, has been, heretofore, merely a transit one.

To the following letter from the most extensive, and concededly leading American woolen manufacturer, I would call your particular attention. Several of its declarations, placed in italics, by me, are highly significant.

LOWELL, Mass., Feb. 10, 1847.

HENRY S. RANDALL, Esq., Cortland Village, N. Y.

My Dear Sir: Your very kind and interesting favor of the 27th ult. duly came to hand and should, if practicable, have received an earlier reply. The business of wool-growing in this country is destined to be of immense importance, and I am firm in the belief that *within twenty-five years we shall produce a greater quantity than any other nation.*

* Compiled by me from Reports of the Secretary of the Treasury.

† The fiscal year 1842 ended on the 30th of September. Since then, the returns of imports and exports have been made up to the 30th of June. This year, therefore, embraces the imports of nine months only, ending on June 30, 1843; and subsequent years end 30th of June, 1844, 1845, and so on.

‡ Report of the Secretary of the Treasury, 1846.

You ask, "Is the present home demand supplied?" There is not enough annually raised in the country by 10,000,000 lbs. to meet the demand of the manufactories.

You ask, "What countries we can export wool to, &c.?" This country will not export wool regularly for fifteen years, for the reason that the consumption will increase as rapidly as the production. I can point out articles made of wool now imported, which will require thirty millions of pounds of that of a medium and fine quality, to supply the consumption.

The business of manufacturing wool in this country is on a better basis than ever before, inasmuch as the character, skill and capital engaged in it are such that FOREIGN COMPETITION IS DEFIED. A very few years and all articles of wool used here will be of home manufacture.

Now I beg of you to keep the wool-growers steady to the mark. Let them aim to excel in the blood and condition of their flocks, and the day is not distant when they will be amply remunerated. I shall always have great pleasure in hearing from you, and remain

Yours most truly, SAM. LAWRENCE.

Mr. Lawrence has certainly got the annual deficit of home wools low enough. Table 10 shows that it was upward of 16,000,000 lbs. during the last fiscal year, 1846. This, of itself, is something of a *margin* for the South, or some other new domestic producer, to fill!

Hitherto we have simply considered the amount of wool necessary to supply our *manufactories*. But these establishments fall very far short of working up all the wool consumed in the United States, even exclusive of home-made fabrics. The following Table* will show the value of the woollens imported for twenty-five years, up to and including 1845:

TABLE No. 11.

1821.. \$7,437,737	1826.. \$8,431,974	1831.. \$12,627,229	1836.. \$21,080,003	1841.. \$11,001,939
1822... 12,185,904	1827... 8,742,701	1832... 9,992,424	1837... 8,500,292	1842... 8,375,725
1823... 8,268,038	1828... 8,679,505	1833... 13,262,509	1838... 11,512,920	1843... 2,472,154
1824... 8,386,597	1829... 6,881,489	1834... 11,879,328	1839... 18,575,945	1844... 9,475,762
1825... 11,392,264	1830... 5,776,396	1835... 17,834,424	1840... 9,071,184	1845... 10,666,176

Here is another and still broader "*margin*" for both the American *Wool-Grower* and the American *Manufacturer* to fill!

With a country well adapted to the production of wool as any the sun shines on—which, all things considered, can produce it *more cheaply* than any extended portion of any trans-Atlantic country—shall we continue to import raw wool?

Whether we should continue to import woollens is sufficiently answered by the last paragraph but one of Mr. Lawrence's letter, fully sustained as the facts therein set forth are by those infallible tests—the *dividends* of our manufacturing establishments. The minimum of these, in *well managed* establishments, has already been stated to be about ten per centum per annum,† and in Mr. Lawrence's own great establishment the dividend of 1846 was *fifteen* per cent. Does any one suppose that the manufacturers of England, with all the advantage they can derive from cheaper labor‡—(but with vastly higher prices for suitable sites and buildings—land taxes, parochial taxes, income taxes—freights and duties on imported wools, etc. etc.)—do or can make dividends touching even the lowest rate above stated? They *cannot*.||

* Report of the Secretary of the Treasury, 1845.

† See Letter VII.

‡ Though not directly advised on the point, I take it for granted that the cost of machinery, also, is somewhat less in England.

|| It may be said that the two last-named expenses fall on the consumer. They doubtless would, but the English manufacturer has to compete with those of France and the United States, a much larger proportion of whose stock is of home growth—the latter entirely, in fine fabrics. The abrogation of the Corn-Laws will be of immense advantage to the English manufacturer, and enable him to better compete with other countries. But while the Bank of England ordinarily discounts paper at from 3 to 4 per cent., and while this is the common rate of interest in that country, it could not be expected that manufacturing capital would be allowed to draw 8 or 10, and much less 15 per cent. Such dividends, in a country whose uninvested capital, or that drawing so low a rate of interest, is so superabundant, would at once invite a competition which would speedily bring the profits of manufacturing capital down to a level with those of other commercial capital. We may, therefore conclude that no such dividends are made.

Is it said that our manufacturing companies have often been compelled to suspend, or break up, even under laws as favorable to them as those now in operation? The reason for this is too pointedly and pertinently stated by Mr. Lawrence to require any addition at my hands, in the following extract from a letter to me, bearing date April 13, 1847; and it will be seen in the concluding sentence that the bold and manly declarations of his preceding letter were not the result of a casual or momentary confidence, but are deliberately reasserted:

"The manufacture of wool has often been disastrous to parties who have embarked in it for many reasons, two of which are sufficient—a want of capital and a want of skill. These difficulties are being obviated. Capitalists are more ready to embark under certain auspices, and the amount of skill is very fast increasing, so that *this branch is on a footing not to be moved.*"

Undisturbed by those changes of vacillating legislation, or those movements in the National Legislature pointing to such changes—at one time enormously pampering the manufacturing interest, and leading to overaction and rash adventure—at another, threatening it with disaster and utter subversion—our manufacturers will steadily, nay, rapidly advance. If NOW LET ALONE, they will soon not only "*defy foreign competition*" in the home market, but there is not a single good reason to prevent them from *defying* it in the great and opening market of South America, and even in the *Old World*. Some evils or errors in commercial legislation are less to be deprecated than constant changes. The present Tariff, so far as it affects wool and woollens, is the result of a compromise of interests. It may not be perfect in principle or detail. But it does not seem to flagrantly favor or oppress any interest. I speak not in the spirit of a politician, or of the representative of an interest or section, when I express the hope that *no change will be made or attempted in this portion of the Tariff, until the lapse of years shall bring about other changes requiring it, or until ample experience shall clearly call for a revision of the system.*

I have spoken of two "margins" to be filled by the American wool-grower—the *present* deficit in supplying our own manufactories, and secondly, the *prospective* one, as our manufactures increase, so as to overtake and then keep pace with the consumption of an increasing population. The demands of our manufactories will advance *pari passu* with the *production*, Mr. Lawrence predicts, for at least fifteen years. Why not for fifty, or a hundred! Let us glance at the *prospective consumption*, and see if, independent of exportations, it is likely to require any curbs or limits to be placed on *production or manufacture*.

In the debates in Congress on the Tariff in 1828-9, Mr. Mallary estimated the consumption of woollens in our country at \$72,000,000 per ann.;—\$10,000,000 imported; \$22,000,000 manufactured; \$40,000,000 home-made. The Committee of the "Friends of Domestic Industry," who met in New-York in 1831, reported that the proportion between the amount of wool worked up in factories to that in families was as 3 to 2; that the entire annual product of wool and its manufactures in the U. S. was \$40,000,000. These are the only accessible published estimates which now occur to me.

The Census of 1840 shows that the value of woollens made in our manufactories in 1839, was \$20,696,999. The import of foreign woollens the same year was \$18,575,945, and of raw wool* \$1,359,445. It should be remarked, however, that the import of woollens is considerably higher than that of any year before or since. Taking the average of the same three

* Taking the average product of 1837-8-9, as in Table 9. The separate import of 1839 is not before me.
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years for which the import of the raw wool is given,* (1837-8-9,) it would reach but \$12,863,051. If we suppose the consumption to equal the supply, this would give \$33,560,050 as the value of the *factory-made* woolens consumed in the United States in 1839. I confess I have no data other than conjectural ones, to determine the amount of the home-made manufactures for that or any other year; nor do I know that any other person has, or can, have such information. The United States Census, singularly enough does not include this as a separate item. It strikes *me*, however, that Mr. Mallery's estimate is too high, and that of the Report of the "Friends of Domestic Industry" too low. The proportion of home-made to factory woolens is, no doubt, annually decreasing, for reasons already stated;† but as far back as 1839, it would perhaps be a fair estimate to set them down as even. This would give \$67,120,100 as the value of the woolens consumed by a population of 17,069,453, or nearly \$4 per head. Allowing that every dollar in the manufactured article would represent one pound of stock, or raw wool—and taking slave-cloths, blankets, carpets, coarse home-made fabrics, factory plains, etc., all into account, a dollar is an ample sum to offset against every pound of the raw material—it follows that our whole population annually consume four pounds of wool per head. Judge Beatty of Kentucky, in an estimate published originally in the *American Agriculturist*, which has been much quoted, sets down the consumption as about 6 lbs. per head. An ordinary Northern farmer or laborer, in comfortable circumstances, will consume about 20 lbs. per annum;‡ the poorer one not far from 15 lbs.; a boy of 8 years old, full 4 lbs.; a girl of that age (in the country, where females are dressed in woolens,) something more than half of that amount. In the cities and villages there is a large class whose consumption for dress ranges from 30 to 40 and even 50 lbs., and, including carpets, much more. A Southern slave consumes from 8 to 10 lbs. Four pounds, therefore, would not seem to be a high estimate, per head, for our whole population.

Let us now take a glance at the increase of population in the United States. The six different Censuses give the following results:

TABLE 12.

1790, Population	3,929,827	1820, Population.....	9,638,191
1800,	5,305,941	1830,	12,866,020
1810,	7,239,814	1840,	17,069,453

It will thus be seen that our population increases at a compound ratio of about three per cent. per annum, which would double it—assuming three per cent. to be the precise rate of increase—in 23 years 164 days.

Cheap and abundant provisions—a supply of fertile lands for all who choose to occupy them, &c.—the causes which have conspired to give so rapid an increase, hitherto, still operate to as great an extent as ever, and will continue to, at all events, for half a century, after the Census of 1840. Suppose the rate of increase, then, decreases to two per cent., which would double the population, reckoning as before, once in about 38 years, and

* In Table 9.

† Letter VII.

‡ He will wear out, during a year, 1 coat, 4 yards; 1 pair pants, 3 yards; 1 vest, 1 yard; 1 pair flannel drawers, 2 yards; 1 flannel shirt, 2½ yards; 4 pair hose, mittens, &c., 1½ lbs., which, calling a yard a pound of wool, all round, would amount to 14 lbs. His extra or holiday suit, 8 yards, will last 3 years, and his overcoat, 6 yards, 4 years—making the annual consumption of both, 3 1-6 yards. Two flannel shirts, 10 yards, will last two persons say 3 years, making the annual consumption of one, 1 1-9 yards. No account is here made of coverlids, wool hats, carpets, still used by many, and the latter, more or less of it, to be found in the houses of nearly all farmers in "comfortable circumstances." It will be seen that 20 lbs. of wool per head is a moderate estimate. The above enumeration would not equal to exceed two-thirds, and in some cases half the clothing annually consumed by the smartly dressing young men who have labored on my farm!

that it doubles twice at this rate—and the following would be the result, and the amount of wool required by the population at the periods indicated:

TABLE No. 13.

Year.	Population.	Amount of Wool.	Year.	Population.	Amount of Wool.
1863-4.....	34,138,906	136,555,624	1925.....	136,555,624	546,222,496
1886-7.....	68,277,812	273,111,248	1963.....	273,111,248	1,092,444,992

Thus in a little over one hundred years, our population is likely to exceed the present one of Europe, (which is 233,500,000,) and we have *now* a sufficient territory to sustain it! At 3 lbs. of wool per head the number of sheep requisite to supply the *home demand* in 1963, would be over 364,000,000!—far more than are now to be found on the whole globe!—Such are some of the *reasonable* expectations which may be formed of the future prospects of the Home wool market.

From the (London) Farmer's Magazine.

NUTRITIVE QUALITIES OF BREAD NOW IN USE.

I HAVE had occasion during the course of many years to pay strict attention to the processes of bread-making, and therefore am prepared to enter upon a subject which the existing state of the country renders of peculiar interest. The title of this article has been adopted in order to embody the leading points of a masterly paper that has lately appeared from the pen of Professor Johnston, of the Edinburgh Society, than whom we do possess an analytic chemist of higher and more trustworthy qualifications. The orders of Queen Victoria in reference to what is styled "second bread," and the laudable zeal with which several noblemen of high rank have adopted similar resolutions, require particular notice, inasmuch as the term "second bread" is of doubtful meaning, and likely to be misunderstood, especially in country districts, where it conveys a definite unfavorable meaning.

The *flour of wheat* is in England of three or four varieties. The first, by way of distinction called "whites," is used in families for the best pastry, or by the bakers to prepare the finest fancy and cottage loaves. The second variety is the "household" flour used in the ordinary baker's household loaf. The third is employed to make seconds bread, which is generally sold at 1d. per loaf of 4 lbs. less than the prime household. There is inferiority of some description in this second flour of the mill; but it does not consist in the retention of the *pollard*, or fine portion of the skin. The country miller, and the families who there bake their own bread upon economical principles, are well advised as to the true meaning of these distinctions. And here, therefore (though the terms of the North may in some slight degree differ from those employed in our agricultural counties), I may appeal to the authority of Professor Johnston, as I practically know that all he says on the subject is strictly correct—thus:

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"The grain of wheat consists of two parts, with which the miller is familiar—the inner grain, and the skin that covers it. The inner grain gives the pure wheat flour, the skin when separated forms the bran. The miller cannot entirely peel off the skin from his grain, and thus some of it is unavoidably ground up with his flour. By sifting he separates it more or less completely; his seconds, middlings, &c., owing their color to the proportion of brown bran that has passed through the sieve along with the flour. The 'whole meal,' as it is called, of which the so-named brown household bread is made, consists of the entire grain ground up together, used as it comes from the mill-stones, unsifted, and therefore containing all the bran."

A fourth sort is used in Berkshire, and indeed in all country districts where families purchase or grow their own wheat and send it to the mill: it is called "farmers' grist," or "one-way flour," and contains all the finer portions of the pollard or middlings, after the separation of the *coarse* bran only; this true wheat flour makes the best bread that can be produced—wholesome, nutritious, of a beautiful clear yellowish white, and of surpassing flavor. It is very economical to the family, especially if the dough be made up with water in which the bran has been infused. But as every sack of the best white wheat, weighing 240 lbs., yields somewhere about 40 lbs. of excellent bran, abounding with meal, so much is abstracted from the corn, and barely 200 lbs.—say rather 196 lbs.—remain to the baker. Now we safely infer that the orders of Her Majesty refer to the best farmers' grist, in contradistinction from the extravagant products of the mill, called "whites" and household flour, from which the miller's cloth has removed *all* the pollard. But in times of real scarcity the entire meal claims our attention, excepting in particular cases where coarse bran is found insalubrious to individuals.

Here again we appeal to the philosophical authority of the Professor. "The solid parts of the human body," says Mr. Johnston, "consist principally of three several portions—the fat, the muscle, and the bone. These three substances are liable to constant waste in the living body, and therefore must be constantly renewed from the food we eat." "Again, the fluid parts of the body contain the substances in a liquid form, on their way to or from the several parts of the body in which they are required. They include also a portion of salt or saline matter that is also obtained from the food." "It is self-evident that that food must be most nourishing which supplies all these ingredients of the body most abundantly on the whole, or in proportions most suited to the actual wants of the individual animal to which it is given."

I have stated that a sack of wheat loses in bran 40 lbs. Professor Johnston forms his estimate lower, thus:

"The amount of husk separated by the miller, and which is not sold for human use, varies much; I do not overestimate it when we consider it as forming one-eighth of the whole. On this supposition eight pounds of wheat yield seven of flour, consumed by man, and one of pollard and bran, which are given to animals—chiefly to poultry and pigs. If the whole meal be used, however, 8 lbs. of flour will be obtained, or eight people will be fed by the same weight of grain which only fed seven before.

The calculation, however, is too low; for thirty pounds of coarse bran only, to say nothing of the pollards, is far below the quantity abstracted from a sack of wheat. The greatest economy of product is unquestionably affected by the use of entire flour made from white wheat, and the quality made from that material is excellent. Such bread is obtained at Croydon; it is sweet and pure in flavor, far from brown in color, and is perfectly salubrious; the cost from 1d. to 1½d. below that of the household loaf. Presuming, then, that the flour from a sack of white wheat weighs 236 lbs., inclusive of the bran, then, if one-third be added for the water imbibed and retained in the bread, the yield of every such sack will be more by a fraction than 314 lbs.—a consideration of immense importance during periods of real or even imaginary scarcity, when the prices become distressingly high.

The *assimilative* qualities of wheat now must be considered, and herein Mr. Johnston's analyses and report must be consulted. We have already seen that he classes the solid parts of the human body under three heads—fat, muscle, and bone; and he follows up the subject thus by inductive reasoning:

"What is the composition of pure white flour which contains no bran, and what the composition of *whole meal*? How much of each is also contained in the whole grain?"

"1. *The Fat*.—Of this ingredient a thousand pounds of the

Whole grain contain	28 lbs.
Fine flour	20 ..
Bran	60 ..

So that the bran is much richer in fat than the interior part of the grain; and the *whole* grain ground together (*whole meal*) is richer than the finer part in the proportion of nearly one-half.

"2. *The Muscular Matter*.—Numerous experiments have been made in my laboratory to determine these proportions in the fine flour and the whole seed of several varieties of grain. The particular results in the case of wheat and Indian corn were as follows:

A thousand pounds of the whole grain and of the fine stock contained of muscular matter

Wheat in the whole grain 156 lbs. In fine flour 130 lbs.	
Indian Corn.....140 ..	110 ..

Here, then, is a marked predominance of the ingredient of strength and *power* in favor of the entire flour of either grain.

"3. *Bone Material (phosphate of lime—bone phosphate) and Saline Material*.—Of these mineral constituents, as they may be called, of the animal body, a thousand pounds of bran, whole meal, and fine flour contain respectively

Bran	700 lbs.
Whole meal	170 ..
Fine flour.....	60 ..

So that, in regard to this important part of our food necessary to all living animals, but especially to the young who are growing, and to the mother who is giving milk, the *whole meal* is three times more nourishing than the fine flour."

If any credence be attached to chemical analyses, and in particular to the experiments of a chemist so thoroughly practical as Professor Johnston, the case of the superior value of whole meal bread is absolutely made out; and it would be found a circumstance of inestimable value to the entire community were there a legislative enactment to the effect that no bread should be publicly baked and sold that was not made either from entire flour, or from the farmers' "one-way" grist before described. The latter, indeed, appears to be the quality of the bread by misconception termed "second;" and I can venture to assert that the loaf prepared from flour of a quality so pure and genuine as that obtained from the mill-ground "one-way" would bring thousands of converts to the opinion now so boldly, and with truth, advanced by Mr. Johnston.

As a farther confirmation of this theory, one more Table of calculations is adduced; it is therein stated that "a thousand pounds of the three substances contain of the three several ingredients the proportions of

	Whole Meal.	Fine Flour.
Muscular matter.....	156 lbs.	130 lbs.
Bone material	170 ..	60 ..
Fat.....	28 ..	20 ..
Total in each.....	354 lbs.	210 lbs.

Taking the three ingredients, therefore, together, the whole meal is one-half more valuable for fulfilling all the purposes of nutrition than the fine flour."

I have not as yet noticed the true *brown bread* of the farm; for although a brown mottled tint obtains in the bran or entire meal loaf, yet *that* differs materially from the genuine brown bread, which can be only produced by the farmers' grist, ground from red or dark-skinned wheat, wherein every particle of the coarser pollard is retained by a mill-cloth employed for the express purpose.

I conclude this article by an appeal to the final and conclusive arguments with which Professor Johnston supports his theory, and to its applicability in especial to the far-famed oatmeal of the North.

"The Deity has done far better for us, by the natural mixtures to be found in the whole seed, than we can do for ourselves. The materials, both in form and *proportion*, are adjusted in each seed of wheat in a way more suitable to us than any which with our present knowledge we appear able to devise.

"The oat is more nutritive even than the whole grain of wheat, taking weight for weight. For the growing boy, for the hard working man, and for the portly matron, oatmeal contains the materials of the most hearty nourishment. This it owes in part to its peculiar chemical composition, and in part to its being, as it is used in Scotland, a kind of whole meal."

Many persons object to oatmeal on the ground of its possessing heating properties—referable to the comparative high proportion of its oily material. Let us admit the fact; but in that case I must be permitted to recommend the use of oatmeal most particularly to persons of a spare or meagre habit. At all events they who know what true "round" oatmeal really is, must prefer it to every other variety. I ascribe its superior excellence to the admirable method of kiln-drying, obtained by experience; and as, through the kindness of a friend, I possess a quantity of the meal received direct from Edinburgh, I can honestly recommend it as incomparably superior to anything that is sold as oatmeal by our English corn-dealers. JOHN TOWERS.

PRICES CURRENT.

[Corrected, August 25, for the Monthly Journal of Agriculture.]

ASHES—Pots, 1st sort.....	5 25 @ 5 37½	Staves, White Oak, pipe, Φ M....	50 — @ —
Pearls, 1st sort, '46.....	8 — @ —	Staves, White Oak, hhd.....	40 — @ —
BEESEWAX—American Yellow.....	24 @ 24½	Staves, White Oak, bbl.....	30 — @ —
CANDLES—Mould, Tallow, Φ lb....	11 @ 13	Staves, Red Oak, hhd.....	24 — @ 28
Sperm.....	30 @ 38	Hoops.....	20 — @ 30
COTTON—From.....	10½ @ 14½	Scantling, Eastern.....	16 25 @ 22 50
COTTON BAGGING—American.....	— @ —	Scantling, Oak.....	30 — @ 35
CORDAGE—American.....	— @ —	Timber, Oak.....	25 @ 30
DOMESTIC GOODS—Shirts, Φ y.....	5 @ 11	Timber, White Pine.....	18 @ 25
Sheetings.....	6½ @ 15	Timber, Georgia Yellow Pine....	28 @ 32
FEATHERS—American, live.....	27 @ 31	Shingles.....	1 75 @ 2 25
FLAX—American.....	7½ @ 8	Shingles, Cedar, 3 feet, 1st quality.	26 — @ 30
FLOUR & MEAL—Genesee, Φ bbl....	5 75 @ 5 81½	Shingles, Cedar, 3 feet, 2d quality.	24 — @ 28
Troy.....	— @ —	Shingles, Cedar, 2 feet, 1st quality.	18 — @ 22
Michigan.....	5 56½ @ 5 68½	Shingles, Cedar, 2 feet, 2d quality.	16 — @ 20
Ohio, Flat Hoop.....	5 56½ @ 5 68½	Shingles, Cypress, 2 feet.....	15 — @ 18
Ohio, Round Hoop.....	— @ —	Shingles, Company.....	35 — @ 38
Ohio, via New-Orleans.....	— @ —	MUSTARD—American.....	— @ —
Pennsylvania.....	— @ —	NAILS—Wrought, 6d to 20d... Φ lb.	10 — @ 14
Brandywine.....	— @ —	Cut. 4d to 40d.....	41 @ 4½
Georgetown.....	— @ 6 25	PLASTER PARIS— Φ ton.....	2 50 @ 2 75
Baltimore City Mills.....	— @ —	PROVISIONS—Beef, Mess, Φ bbl....	12 50 @ 13 25
Richmond City Mills.....	— @ —	Beef, Prime.....	8 50 @ 9 —
Richmond Country.....	— @ —	Pork, Mess, Ohio, new.....	15 12½ @ 15 25
Alexandria, Petersburg, &c.....	— @ —	Pork, Prime, Ohio, new.....	12 12½ @ 12 25
Rye Flour.....	4 — @ 4 25	Lard, Ohio.....	10 @ 11½
Corn Meal, Western and State....	2 50 @ 3 —	Hams, Pickled.....	7 @ 7½
Corn Meal, Jersey and Brandywine	3 50 @ 3 75	Shoulders, Pickled.....	6 @ 6½
GRAIN—Wheat, White..... Φ bush.	1 25 @ 1 35	Sides, Pickled.....	— @ —
Wheat, Red and mixed.....	1 — @ 1 20	Beef, Smoked.....	10½ @ —
Rye, Northern, new and old.....	90 @ 93	Butter, Orange County Dairy....	19 @ 20
Corn, Jersey and Northern yel....	— @ 78	Butter, Western Dairy.....	14 @ 16
Corn, Southern, yellow.....	72 @ 74	Butter, Grease.....	— @ —
Corn, Western, yellow.....	73 @ 75	Cheese, in casks and boxes.....	7 @ 8
Oats, River and Canal.....	60 @ —	SEEDS—Clover..... Φ lb.	7 @ 7½
Oats, Jersey.....	— @ —	Timothy..... Φ tierce	16 — @ 20
HAY—North River in bales, Φ 100 lb	— @ 50	Flax, Rough.....	— @ —
HEMP—American, dew-rotted... ton	140 — @ 150 —	SOAP—N. York, Brown..... Φ lb.	4 @ 5½
" " water-rotted.....	175 — @ 200 —	TALLOW—American Rendered....	9½ @ 9½
HOPS—1st sort 1846.....	10 @ 15	TOBACCO—Virginia..... @ lb.	3 @ 7½
IRON—American Pig, No. 1.....	30 — @ 35 —	North Carolina.....	— @ —
" " Common.....	27 50 @ 30 —	Kentucky and Missouri.....	3 @ 7½
LIME—Thomaston..... Φ bbl.	87½ @ 90	WOOL—Am. Saxony, Fleece... Φ lb.	40 @ 45
LUMBER—Boards, N.R., Φ M. ft. clr.	35 — @ 40 —	American Full Blood Merino....	35 @ 38
Boards, Eastern Pine.....	— @ —	American ½ and ¾ Merino.....	30 @ 34
Boards, Albany Pine..... Φ pce.	12 @ 21	American Native and ¾ Merino....	26 @ 28
Plank, Georgia Y. Pine. Φ M. ft....	27 50 @ —	Superfine, Pulled Country.....	32 @ 34